

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KOKI HOLDINGS AMERICA LTD.

Petitioner

v.

KYOCERA Senco INDUSTRIAL TOOLS, INC.

Patent Owner.

PETITION FOR INTER PARTES REVIEW
U.S. PATENT NO. 10,478,954

Case No. IPR2025-00262

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
PO Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
TABLE OF EXHIBITS	v
LISTING OF CHALLENGED CLAIMS.....	vi
INTRODUCTION	1
MANDATORY NOTICES.....	2
A. Real Parties-In-Interest.....	2
B. Related Matters.....	2
C. Counsel	3
D. Service Information.....	3
FEES	3
REQUIREMENTS FOR IPR.....	3
E. Grounds for Standing	3
F. Challenge and Relief Requested	4
SUMMARY OF THE '954 PATENT	4
G. Brief Description	4
H. Summary of the Prosecution	6
CLAIM CONSTRUCTION.....	7
REASONABLE LIKELIHOOD OF UNPATENTABILITY	9
I. Ground 1: Claims 1-20 are Obvious based on Haley in view of Lai.....	9
1. <i>Claim 1</i>	9
2. <i>Claim 2</i>	26

3.	<i>Claim 3</i>	27
4.	<i>Claim 4</i>	29
5.	<i>Claim 5</i>	32
6.	<i>Claim 6</i>	33
7.	<i>Claim 7</i>	33
8.	<i>Claim 8</i>	34
9.	<i>Claim 9</i>	37
10.	<i>Claim 10</i>	38
11.	<i>Claim 11</i>	38
12.	<i>Claim 12</i>	38
13.	<i>Claims 13-17</i>	39
14.	<i>Claim 18</i>	39
15.	<i>Claims 19-20</i>	41
J.	Ground 2: Claims 1-20 are Obvious based on Saari and Enstrom in view of Lai	41
1.	<i>Claim 1</i>	42
2.	<i>Claim 2</i>	53
3.	<i>Claim 3</i>	55
4.	<i>Claim 4</i>	58
5.	<i>Claim 5</i>	60
6.	<i>Claim 6</i>	61
7.	<i>Claim 7</i>	61
8.	<i>Claim 8</i>	62

9.	<i>Claim 9</i>	66
10.	<i>Claim 10</i>	67
11.	<i>Claim 11</i>	67
12.	<i>Claim 12</i>	67
13.	<i>Claims 13-17</i>	68
14.	<i>Claim 18</i>	68
15.	<i>Claims 19-20</i>	70
K.	Ground 3: Claims 1-20 are Obvious based on Kondo	70
1.	<i>Claim 1</i>	70
2.	<i>Claim 2</i>	80
3.	<i>Claim 3</i>	82
4.	<i>Claim 4</i>	83
5.	<i>Claim 5</i>	85
6.	<i>Claim 6</i>	86
7.	<i>Claim 7</i>	87
8.	<i>Claim 8</i>	88
9.	<i>Claim 9</i>	91
10.	<i>Claim 10</i>	91
11.	<i>Claim 11</i>	92
12.	<i>Claim 12</i>	92
13.	<i>Claims 13-17</i>	93
14.	<i>Claim 18</i>	93
15.	<i>Claims 19-20</i>	94

L.	Ground 4: Claims 1-20 are Obvious based on Pedicini	94
1.	<i>Claim 1</i>	94
2.	<i>Claim 2</i>	103
3.	<i>Claim 3</i>	104
4.	<i>Claim 4</i>	106
5.	<i>Claim 5</i>	107
6.	<i>Claim 6</i>	108
7.	<i>Claim 7</i>	109
8.	<i>Claim 8</i>	109
9.	<i>Claim 9</i>	112
10.	<i>Claim 10</i>	113
11.	<i>Claim 11</i>	113
12.	<i>Claim 12</i>	113
13.	<i>Claims 13-17</i>	114
14.	<i>Claim 18</i>	114
15.	<i>Claims 19-20</i>	115
	CONCLUSION	115

TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,478,954 to Leimbach (“the ’954 patent”)
1002	Prosecution History of the ’954 patent
1003	Declaration of Dr. Glenn E. Vallee
1004	U.S. Patent No. 3,150,488 (“Haley”)
1005	U.S. Patent No. 5,503,319 (“Lai”)
1006	U.S. Patent No. 3,924,692 (“Saari”)
1007	U.S. Patent No. 3,913,685 (“Enstrom”)
1008	U.S. Patent No. 5,720,423 (“Kondo”)
1009	U.S. Patent Publication No. 2006/0180631 (“Pedicini”)
1010	U.S. Patent No. 4,834,278 (“Lin”)
1011	U.S. Publication No. 2006/0261127 (“Wolf”)
1012	U.S. Patent No. 3,636,707 (“Saari ’707”)
1013	U.S. Patent No. 4,953,774 (“Lai ’774”)
1014	U.S. Patent No. 860,536 (“Ellingham”)

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.P]	1. A fastener driver adapted for use in a fastener driving tool, said fastener driver comprising:
[1.1]	(a) a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston;
[1.2]	(b) a guide body that is sized and shaped to receive a fastener that is to be driven;
[1.3]	(c) a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body;
[1.4]	(d) a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder, such that said storage chamber and said displacement volume are initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle; and
[1.5]	(e) a lifter that, under first predetermined conditions, moves said movable driver toward a ready position;
[1.6]	wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.
Claim 2	
[2]	2. The fastener driver of claim 1, wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.
Claim 3	
[3]	3. The fastener driver of claim 1, wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said

	movable driver and forces said movable driver to move toward its ready position, using a rotary-to-linear motion.
Claim 4	
[4.1]	4. The fastener driver of claim 3, wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another,
[4.2]	such that said at least one extension of said lifter fits in a space between said spaced-apart plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby causing said movable driver to move in a substantially linear direction within a driver track of said guide body.
Claim 5	
[5]	5. The fastener driver of claim 4, further comprising: a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.
Claim 6	
[6]	6. The fastener driver of claim 1, wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driver.
Claim 7	
[7]	7. The fastener driving tool of claim 1, wherein said fastener driver is designed to operate in a repeatable cycle of driving events, in which each driving event includes: (a) a driving stroke under said first predetermined conditions, which causes said movable driver to move toward said driven position, and (b) a return stroke under said second predetermined conditions, which causes said movable driver to move toward said ready position.
Claim 8	
[8.P]	8. A fastener driving tool, comprising:

[8.1]	(a) a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston;
[8.2]	(b) a guide body that is sized and shaped to receive a fastener that is to be driven;
[8.3]	(c) a movable driver that moves with said piston, said movable driver being sized and shaped to push said fastener from said guide body;
[8.4]	(d) a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder, such that said storage chamber and said displacement volume are initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle;
[8.5]	(e) an on-board electrical energy source, with no external energy source attached to said fastener driving tool;
[8.6]	(f) a lifter that, under first predetermined conditions, moves said movable driver toward a ready position;
[8.7]	(g) a prime mover that is powered by said on-board electrical energy source, said prime mover causing said lifter to move, under first predetermined conditions; and
[8.8]	(h) a housing that holds said hollow cylinder, guide body, movable driver, storage chamber, on-board electrical energy source, lifter, and prime mover as a single, portable hand-operable tool;
[8.9]	wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.
Claim 9	
[9]	9. The fastener driving tool of claim 8, wherein said on-board electrical energy source comprises a battery.
Claim 10	
[10]	10. The fastener driving tool of claim 8, wherein said prime mover comprises an electric motor.

Claim 11	
[11]	11. The fastener driving tool of claim 8, wherein said fastener driving tool is designed to operate in a repeatable cycle of driving events, in which each driving event includes: (a) a driving stroke under said first predetermined conditions, which causes said movable driver to move toward said driven position, and (b) a return stroke under said second predetermined conditions, which causes said movable driver to move toward said ready position.
Claim 12	
[12]	12. The fastener driving tool of claim 8: wherein said prime mover is powered by an electrical power supply that is carried on said tool.
Claim 13	
[13]	13. The fastener driving tool of claim 8, wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.
Claim 14	
[14]	14. The fastener driving tool of claim 8, wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said movable driver and forces said movable driver to move toward its ready position, using a rotary-to-linear motion.
Claim 15	
[15]	15. The fastener driving tool of claim 14, wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another, such that said at least one extension of said lifter fits in a space between said spaced-apart plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby

	causing said movable driver to move in a substantially linear direction within a driver track of said guide body.
Claim 16	
[16]	16. The fastener driving tool of claim 15, further comprising: a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.
Claim 17	
[17]	17. The fastener driving tool of claim 8, wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driving tool.
Claim 18	
[18.P]	18. A fastener driver adapted for use in a fastener driving tool, said fastener driver comprising:
[18.1]	(a) a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston;
[18.2]	(b) a guide body that is sized and shaped to receive a fastener that is to be driven;
[18.3]	(c) a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body;
[18.4]	(d) a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder, such that said storage chamber and said displacement volume are initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle; and
[18.5]	(e) a rotating lifter that, under first predetermined conditions, moves said movable driver toward a ready position, using a rotary-to-linear motion;
[18.6]	wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven

	position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.
Claim 19	
[19]	19. The fastener driver of claim 18, wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.
Claim 20	
[20]	20. The fastener driver of claim 18, wherein said rotating lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said movable driver and forces said movable driver to move toward its ready position, using said rotary-to-linear motion.

I. INTRODUCTION

Koki Holdings America Ltd. (“Petitioner”) petitions for Inter Partes Review (“IPR”) of claims 1-20 of U.S. Patent No. 10,478,954 (“the ’954 patent”). The ’954 patent describes “portable tools that drive staples, nails, or other linearly driven fasteners” and, more specifically, “a gas spring linear fastener driving tool, in which a cylinder filled with compressed gas is used to quickly force a piston through a driving stroke movement, while also driving a fastener into a workpiece.” Ex. 1001, 1:28-34.

The gas spring tool claimed in the ’954 patent is not the result of any innovation on the part of the named inventors, but instead amounts to a grab-bag of conventional, off-the-shelf designs that was made possible by recent advancements in the unrelated field of lightweight rechargeable lithium-ion batteries. The idea of gas spring nailers date back to the 1960’s and 1970’s (as shown by the Haley and Saari patents) and the structure of the claimed “lifter member” was developed in the mid-1990’s (as shown by the Lai and Kondo patents). Grounds 1-2 are based on prior art combinations that were never substantively considered by the USPTO. Grounds 3-4 show how the claims are also unpatentable based on the prior art that was considered during original examination.

II. MANDATORY NOTICES

A. Real Parties-In-Interest

Koki Holdings America Ltd. and Koki Holdings Co., Ltd. are the real parties-in-interest.

B. Related Matters

The challenged patent has not been previously asserted. Related patents from the same patent family have been involved in litigation. On January 25, 2017, the Patent Owner filed a complaint in *Senco Brands, Inc. v. Hitachi Koki USA Ltd.*, S.D.OH. No. 1:17-cv-00061, asserting infringement of U.S. Patent Nos. 8,011,547, 8,267,296, 8,267,297, 8,286,722, 8,387,718, and 8,602,282 against Petitioner. That case was refiled on May 23, 2017 as D.DE. No. 1:17-cv-00598. On September 25, 2017, the Patent Owner requested a Section 337 investigation at the International Trade Commission (ITC) allegations for the same patents, which was instituted as *Certain Gas Spring Nailers and Components Thereof*, ITC Inv. No. 337-TA-1082. The district court case was stayed pending resolution of the ITC investigation. The ITC investigation led to cross-appeals: *Kyocera Senco Indus. Tools Inc. v. ITC*, C.A.F.C. No. 20-1046 and *Koki Holdings America Ltd. v. ITC*, C.A.F.C. No. 20-2050. The Federal Circuit affirmed the ITC's finding of no violation on January 21, 2022 for four of the patents and reversed the ITC's finding of a violation for the fifth

patent (one patent was withdrawn). On remand, the ITC terminated the investigation at the patent owner's request.

The '954 patent is in the same patent family as U.S. Patent Nos. 11,034,007, 11,241,776, and 11,845,167 for which Petitioner is concurrently petitioning for IPR.

C. Counsel

Petitioner provides the following designation of counsel:

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D. Service Information

Please address all correspondence to the lead counsel's address above. Petitioner also consents to electronic service by email at Koki_IPR@mwe.com.

III. FEES

Petitioner authorizes the Office to charge Deposit Account No. 50-0417 for the petition fee set in 37 C.F.R. §42.15(a) and for any other required fees.

IV. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the '954 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

B. Challenge and Relief Requested

Petitioner requests IPR of claims 1-20 of the '954 patent on the grounds listed below. This Petition is supported by the declaration of Dr. Glenn Vallee. ("Vallee").

Ground	Claims	Basis for Rejection
1	1-20	Obvious based on U.S. Patent No. 3,150,488 ("Haley") in view of U.S. Patent No. 5,503,319 ("Lai")
2	1-20	Obvious under §103 based on U.S. Patent Nos. 3,924,692 ("Saari") and 3,913,685 ("Enstrom") in view of U.S. Patent No. 5,503,319 ("Lai")
3	1-20	Obvious based on U.S. Patent No. 5,720,423 ("Kondo")
4	1-20	Obvious based on U.S. Patent Publication No. 2006/0180631 ("Pedicini")

Haley issued in 1964. Saari and Enstrom issued in 1975. Lai issued in 1996. Kondo issued in 1998. Pedicini was published on August 17, 2006. All qualify as prior art because they were patented or published over a year before the earliest possible priority date, which is the filing of a provisional application on October 5, 2007. Kondo and Pedicini are discussed in the specification of the '954 patent and identified as "Related Art."

V. SUMMARY OF THE '954 PATENT

A. Brief Description

The '954 patent is directed to "a gas spring linear fastener driving tool, in which a cylinder filled with compressed gas is used to quickly force a piston through

a driving stroke movement, while also driving a fastener into a workpiece.” ’954 patent, 1:30-34. In an embodiment illustrated below, a driver member 490 (orange) is attached to a piston 458 (green) and lifted by a lifter member 400 (bright yellow) against compressed gas in a hollow cylinder 492 (light yellow) and a main storage chamber 454 (blue). ’954 patent, Figs. 20-21, 21:50-22:15. The driver member is then released and the compressed gas pushes no the piston and driver member to drive a nail (red) into a workpiece. *Id.*

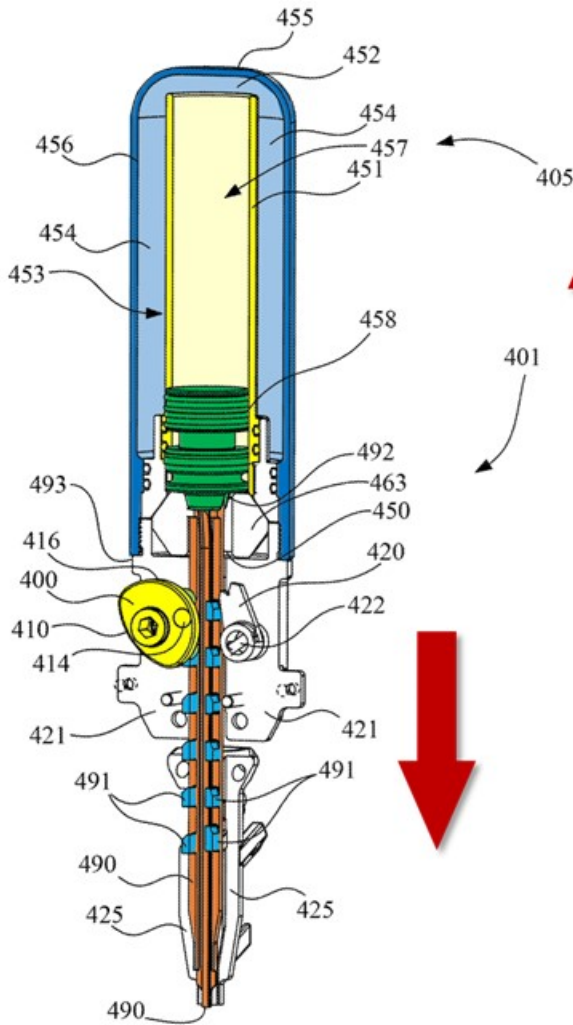


Fig. 20

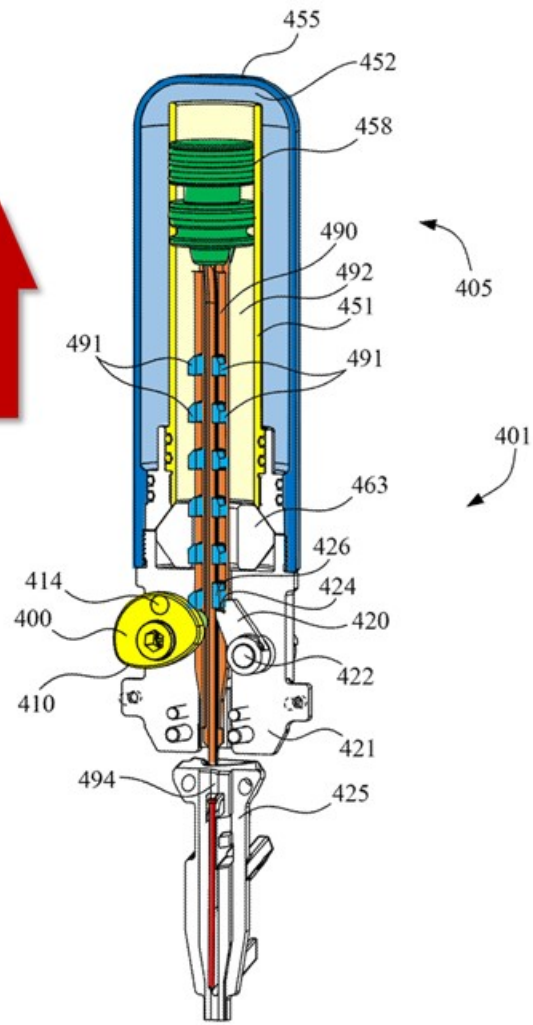


Fig. 21

B. Summary of the Prosecution

The '954 patent issued from a continuation application filed on May 1, 2017, was granted on November 19, 2019, and claims priority through four applications to a provisional application filed on October 5, 2007. During prosecution, the independent claims were rejected for double-patenting based on claims in related patents. Patent Owner filed a terminal disclaimer and an amendment to remove

recitations of a “driven position” and “ready position.” The claims were subsequently allowed.

VI. CLAIM CONSTRUCTION¹

The Federal Circuit held that the term “lifter member” in the related patents is a means-plus-function term subject to §112(f). Petitioner submits the terms “lifter” and “rotating lifter” in the claims of the ’954 patent are likewise means-plus-function terms, because they lack any “recital of structure, material, or acts in support thereof” for the “lifter” element. 35 U.S.C. §112(f). The “lifter” and “rotating lifter” of the independent claims only describe a function and are not accompanied by any structural recitations. ’954 patent, claims 1, 8, 18. Furthermore, the dependent claims cannot transform the means-plus-function “lifter” from the independent claims into a broader, *non*-means-plus-function term, because §112(d) requires each of those dependent claims “shall be construed to incorporate by reference all the limitations of the claim to which it refers” and must “specify a further limitation.” 35 U.S.C. §112(d).

The parties agreed during the ITC investigation that “main storage chamber” means “a chamber that is distinct from the volume of the cylinder and contains part of the working air volume during operation.” A dispute later arose as to how to

¹ The constructions of these terms are only relevant to Ground 4 and is not necessary for Grounds 1-3, since they satisfy any conceivable constructions.

interpret the agreed-upon construction. Petitioner believed the terms “volume” and “cylinder” in the agreed construction respectively referred to the “displacement volume” and “hollow cylinder” expressly recited in the claims. In contrast, Patent Owner conceded that “cylinder” referred to the claimed “hollow cylinder,” but alleged that “volume” did not refer the claimed “displacement volume” and instead referred to the entire region enclosed by the “hollow cylinder,” including regions that are not part of the “displacement volume.” The ITC ultimately found in the Patent Owner’s favor. On appeal, the Federal Circuit did not conduct a *de novo* claim construction (as it did for “lifter member”), but instead only reviewed the ITC’s resolution of the parties’ dispute over the agreed-upon construction at the deferential clear error standard. *Kyocera Senco Indus. Tools Inc. v. ITC*, 22 F.4th 1369, 1381 (Fed. Cir. 2022).

Given the misunderstanding caused by the ambiguity in the prior agreed-upon construction—and given that the ITC’s claim construction is not binding here or in any other forum beyond the ITC—Koki proposes that “storage chamber” be construed with clarification to mean “a chamber that is distinct from the displacement volume of the hollow cylinder and contains part of the working air volume during operation.” The claims only recite two volumes: the “storage

chamber” and the “displacement volume.”² The only “volume” that is already allocated in the “hollow cylinder” is its “displacement volume,” which is the portion of that cylinder “created by a stroke of said piston.” ’954 patent, 10:12-15, claims 1, 7, 14. Certain dependent claims in related patents require the “storage chamber” to be outside the cylinder (*see* U.S. Patent No. 9,676,088 patent, claim 5), but there is nothing in the intrinsic record or any of the claims of the ’954 patent that prevents the “main storage chamber” from being in the hollow cylinder, so long as it is distinct from its separately-recited “displacement volume.” Furthermore, the ’954 patent claims differ from those considered by the ITC and Federal Circuit in that they recite a “storage chamber” rather than the “*main* storage chamber,” which further undermines any argument in favor of a narrow construction that excludes any volume within the hollow cylinder.

VII. REASONABLE LIKELIHOOD OF UNPATENTABILITY

A. Ground 1: Claims 1-20 are Obvious based on Haley in view of Lai

1. Claim 1

Element [1.P]

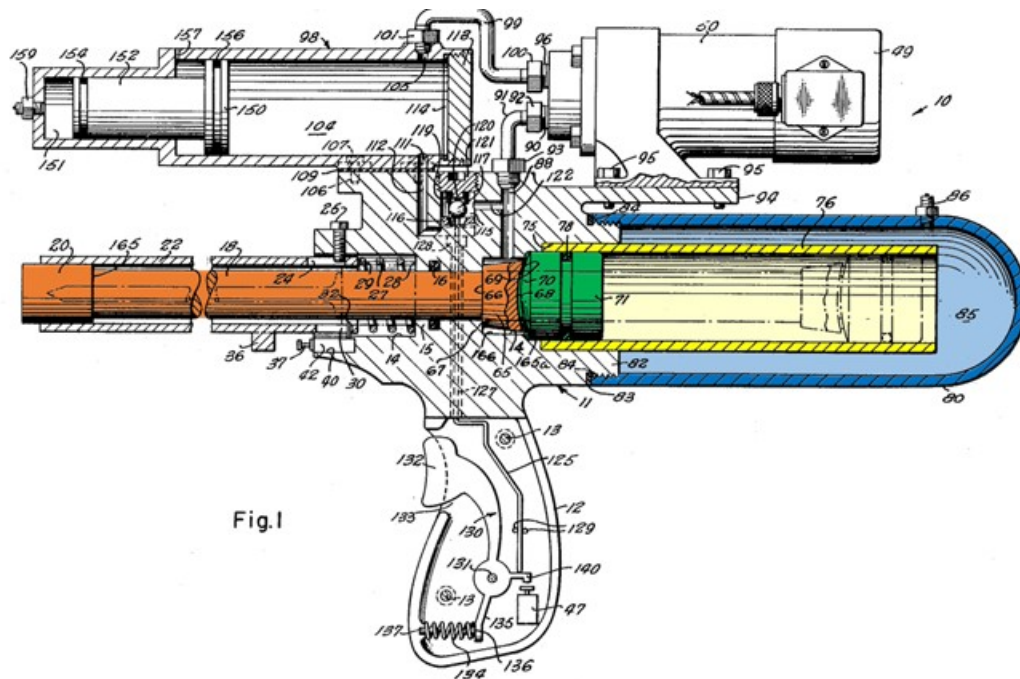
U.S. Patent No. 3,150,488 (“Haley”) discloses “[a] fastener driver adapted for use in a fastener driving tool.” Haley’s “invention relates to power devices and more

² The “storage chamber” does not refer to a separate physical enclosure, but rather to a fixed volume of air. ’954 patent, 21:57-62.

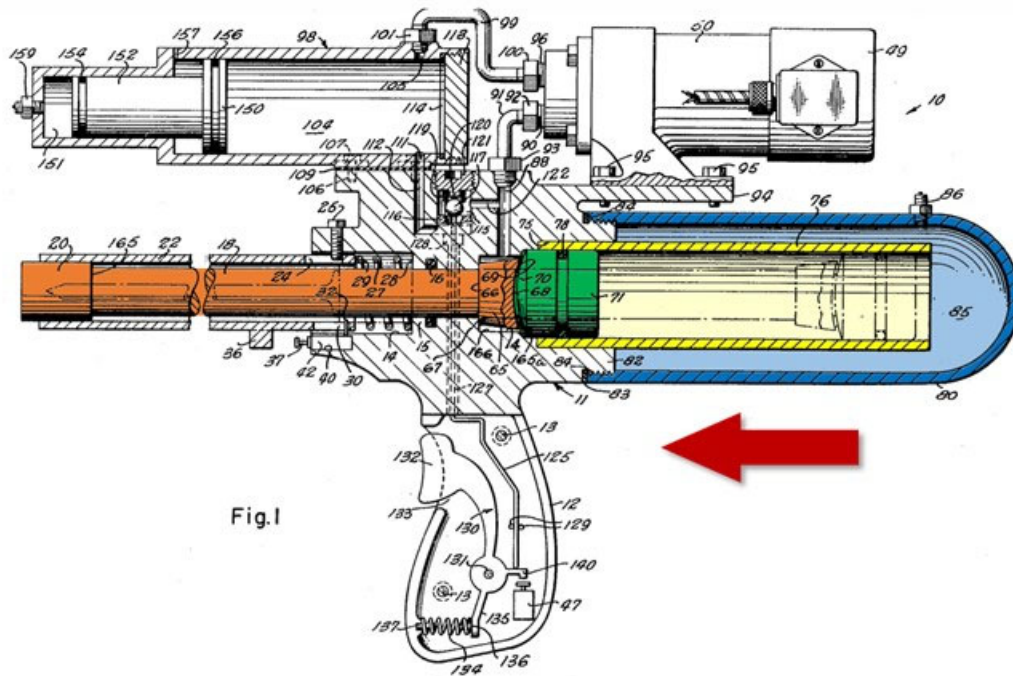
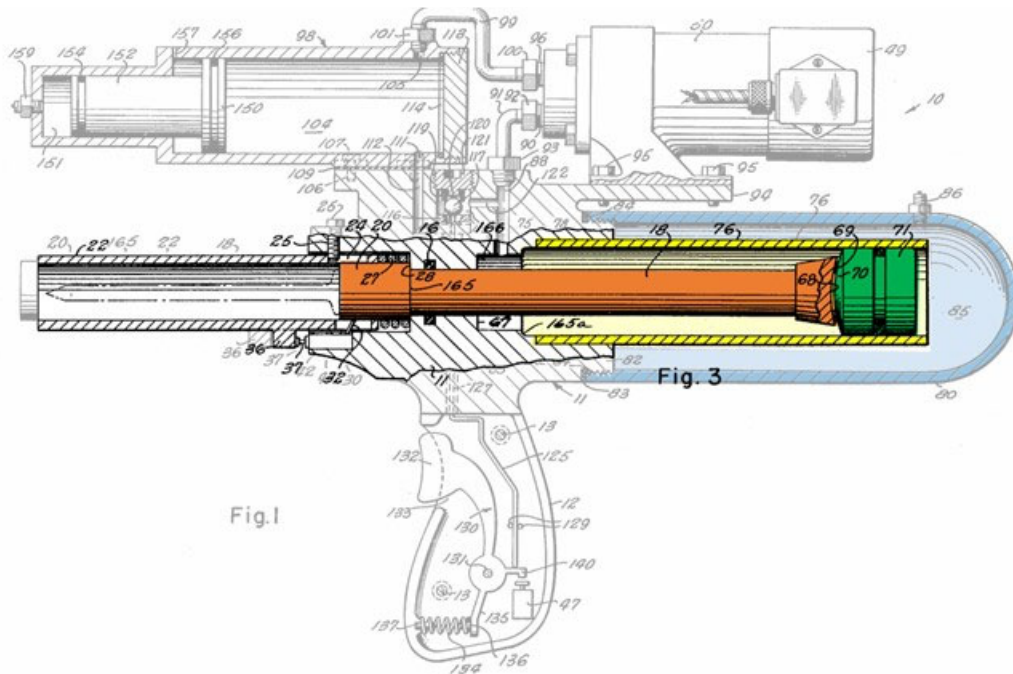
particularly to a pressure fluid power device for operating hand tools.” Haley, 1:7-9.

Element [1.1]

Haley discloses “a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston.” Haley has a hollow cylinder (“extension cylinder 76,” yellow) and a piston (“accumulator piston 71,” green) that is “moveable within the cylinder extension.” Haley, 3:33-39, Figs. 1-4.

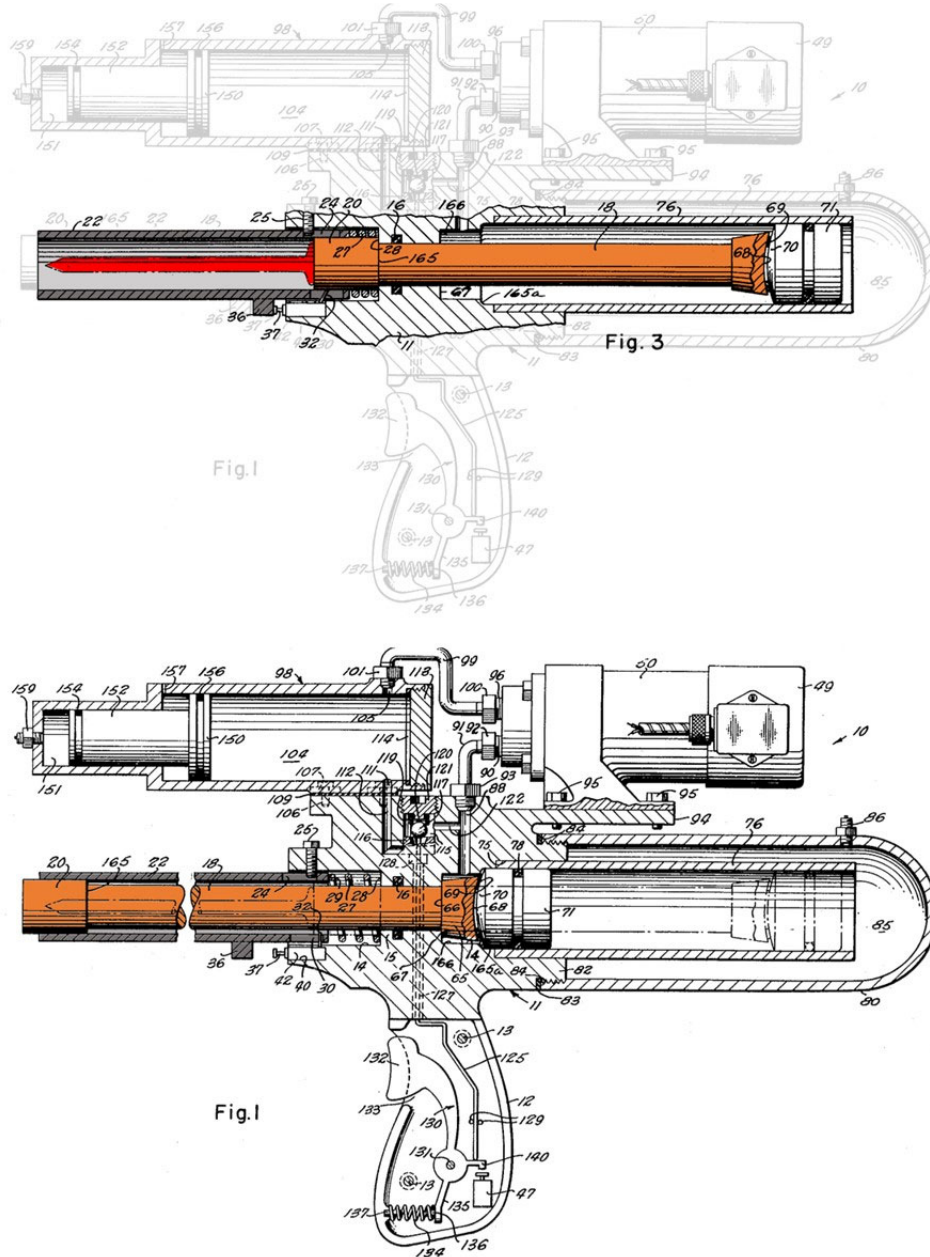


The hollow cylinder has a displacement volume created by the stroke of the piston, shown by Figure 1’s dashed-line illustration of the piston. Haley, Figs. 1, 3.



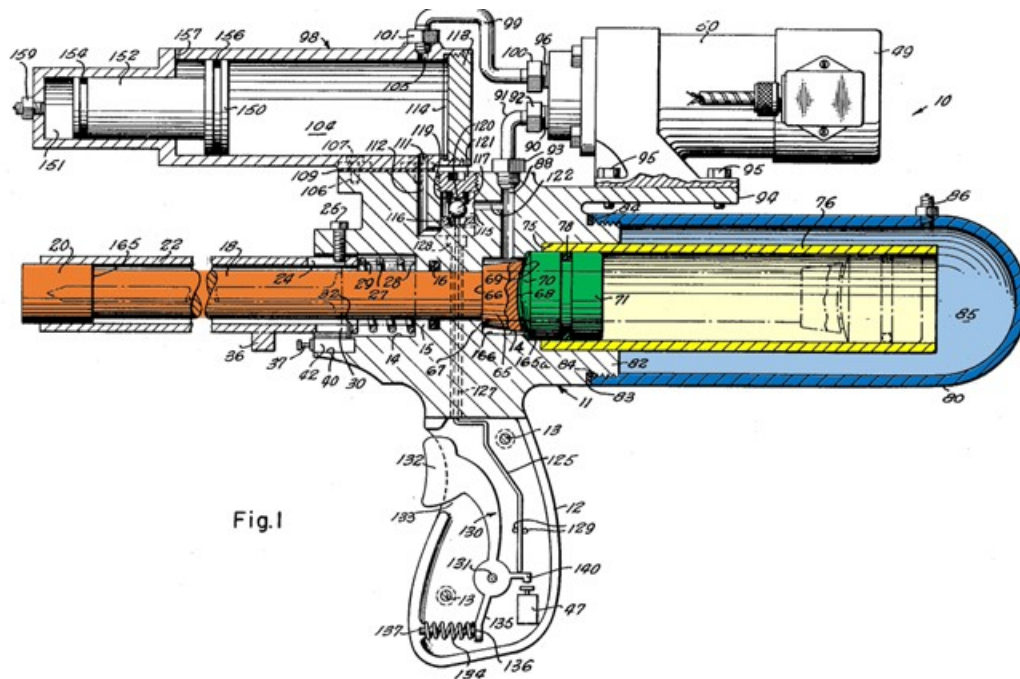
Element [1.2]

Haley discloses “a guide body that is sized and shaped to receive a fastener that is to be driven.” Haley’s guide body (“guide barrel 22,” grey) is sized and shaped to receive a fastener (nail, red). Haley, 2:23-27, Figs. 1, 3.



Element [1.3]

Haley discloses “a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body.” Haley’s “movable driver” (“drive piston 18” and “hammerhead 20,” orange) is in communication with its piston (“accumulator piston 71,” green). Haley, 2:20-23, 5:51-70, 5:74-6:7, Fig. 1-4.



Element [1.4]

Haley discloses “a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder.” Haley’s storage chamber (“chamber 85,” blue) is formed by “elongate accumulator shell 80.” Haley, Fig. 1; 3:40-54.

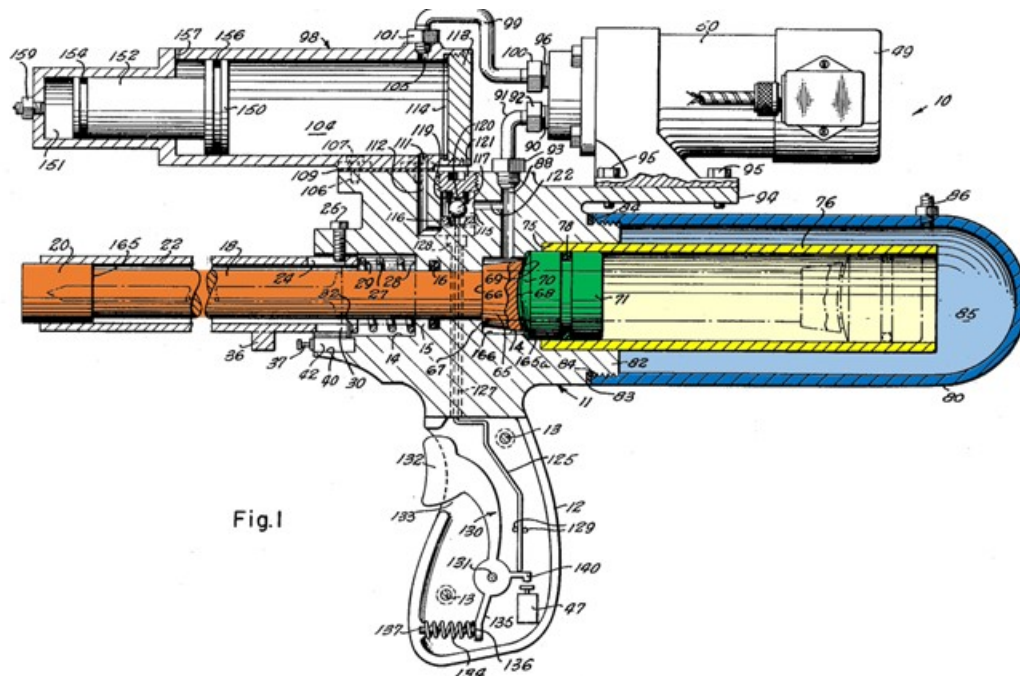


Fig.1

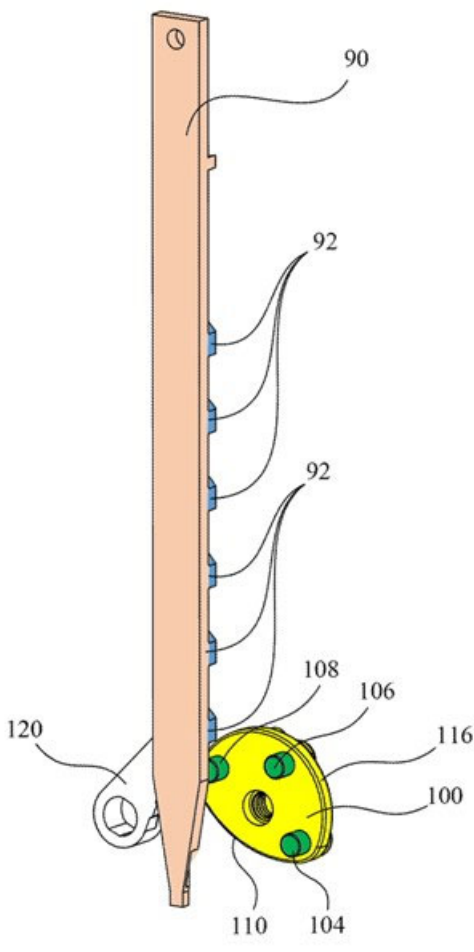
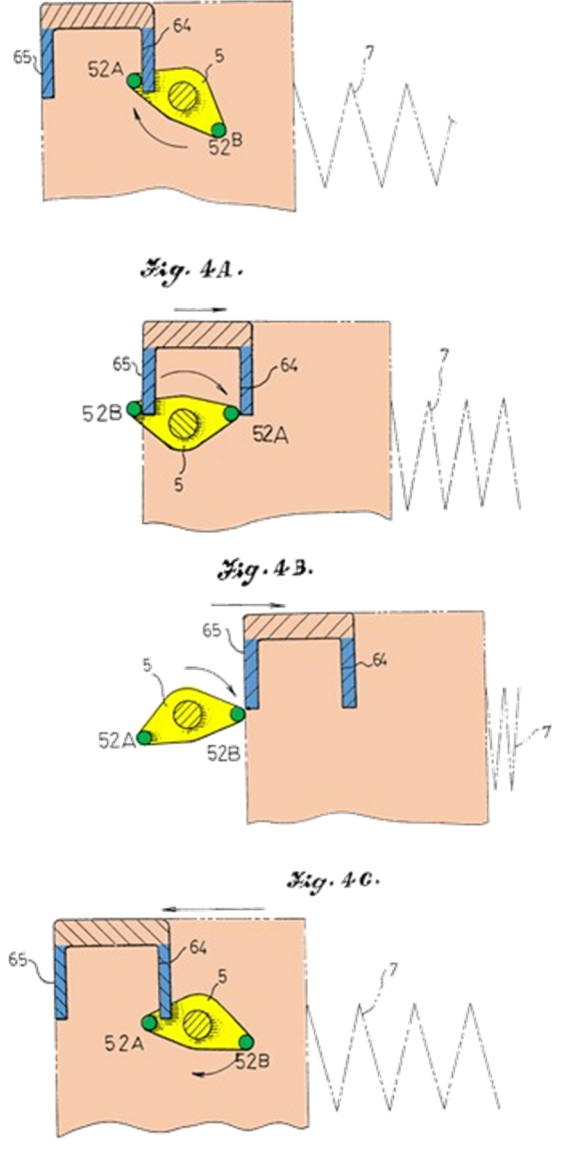
Haley's storage chamber (blue) is distinct from its cylinder (yellow) and remains in fluidic communication at all times with the displacement volume. See Haley, Fig. 1.

Haley's storage chamber and said displacement volume are "initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle." Haley's "gas introduced into the gas chamber 85 may be initially of a relatively large value, say 1,000 pounds per square inch." Haley, 7:1-13. Movement of the accumulator piston upward causes the gas pressure in chamber to increase up to 2,000 psi. Haley, 7:6-10. Both values are above atmospheric pressure (14.7 psi). Vallee, ¶57.

Element [1.5]

Haley discloses a hydraulic lifting mechanism and thus does not have “a lifter that, under first predetermined conditions, moves said movable driver toward a ready position.” However, it was obvious to replace Haley’s hydraulic lifter with the claimed “lifter,” as disclosed by U.S. Patent No. 5,503,319 (“Lai”). Vallee, ¶58.

Lai discloses an electrically-powered, mechanical lifting mechanism with a structure that is essentially identical to the “lifter member” disclosed in the ’954 patent. *Compare* ’954 patent, Fig. 12 with Lai, Figs. 3-4. The “lifter member” of the ’954 patent includes a rotatable cam lifter 100 (yellow, below left), with pin 104, 106, and 108 (green) on its face surface that engage protrusions 92 (blue) on the driver member 90 (orange). ’954 patent, 9:25-41, 16:32-46, Fig. 12. The ’954 patent also discloses two-pin variants: lifter members 465 and 480 in Figs. 31, 33. ’954 patent, 32:12-27, 32:45-60. Lai discloses a rotatable cam 5 (yellow, below right), with pins 52A and 52B (green) on its face surface that engage two protrusions 64 and 65 (blue) from a U-shaped member 61 on the driver member 6 (“hammer,” orange). Lai, 1:62-63, 2:14-25, Figs. 4A-D. Lai’s lifter member is moved by a prime mover (“motor 3”). Lai, 2:14-16, Fig. 2.

'954 Patent Lifter Member	Lai Lifter Member
 Fig. 12	 Fig. 4A. Fig. 4B. Fig. 4C. Fig. 4D.

Lai is directed to an “electric stapling gun.” Lai, 1:1-2. The ’954 patent covers “portable tools that drive staples, nails, or other linearly driven fasteners.” ’954 patent, 1:27-29. A POSITA would consider staplers to be a subcategory of nailers. Vallee, ¶61. For example, U.S. Patent No. 4,834,278 (“Lin,” Ex. 1010) is

titled “Structure of DC Motorized Nailing Machine” and discloses a preferred embodiment that drives staples. Ex. 1010. Thus, Lai and Lin are directly relevant prior art for the ’954 patent. Developments in portable nailers would tend to appear first in the context of portable staplers such as Lin and Lai due to the lower power needed to drive staples as compared to nails, and these improvements would later be applied generally to portable nail guns, notwithstanding their larger power drain requirements, as battery technology continued to improve. Vallee, ¶62. While Lin and Lai use metal springs rather than compressed gas springs, a POSITA would consider metal springs and compressed-gas springs to be interchangeable depending on the use case. Vallee, ¶62. This is reflected by various prior art references—Saari discloses an embodiment “which utilizes a compressible gas, such as air or the like, as the spring means” (Saari, 4:1-3) and U.S. Publication No. 2006/0261127 (“Wolf,” Ex. 1011) discloses an embodiment where “the compression spring element 42 is formed as a gas spring (Wolf, ¶[0048]). The ’954 patent reflects this interchangeability with an embodiment where the compressed gas spring is exchanged for “a mechanical spring 496, which could be a fast-acting coil spring.” ’954 patent, 28:58-65. Thus, a POSITA would look to Lai’s portable stapler design for improvements to incorporate into nailers such as Haley’s nail gun and would have done so by the filing of the ’954 patent as battery technologies had continued to progress following Lai’s issuance in 1996. Vallee, ¶62.

A POSITA was motivated to replace Haley's hydraulic lifting mechanism with Lai's lifter member. Haley's hydraulic lifting mechanism was a known problem, because it was bulky and subject to the risk of hydraulic fluid leaking into the compressed gas chambers. Vallee, ¶¶63-70. This problem was explicitly discussed less than a decade later in U.S. Patent No. 3,636,707 ("Saari '707," Ex. 1012), which explained that "[t]he Haley devices are cumbersome, too heavy for prolonged use by an operator and subject to comingling of the noncompressible fluid with the compressible fluid or gas resulting in malfunctioning of the devices as well as having too long a time cycle between operative strokes thereof." Saari '707, 1:12-16. These problems stemmed solely from Haley's hydraulic lifting mechanism and a complete solution to Haley's identified problem was not feasible at the time of Saari '707, which could only address the cumbersomeness factor by moving the hydraulic pump off the tool. Vallee, ¶64; Saari '707, 5:20-28. Not long after, Saari disclosed another powered nailer that eliminated the hydraulic lifting mechanism and replaced it with an electrically-powered mechanical lifter. *See* Saari. That trend to electrically-powered mechanical lifting mechanisms is also reflected by Lin, which denigrates both "pneumatic power operated and motorized stapling machines" because they are "not portable and the utility of which are within the confines of the area where power source is available." Lin, 1:27-30. Lin's proposed solution involved "a nailing machine to make use of battery power to drive a DC

motor so as to turn round gear set, ball screws and gear wheel, letting spring and guide block start nailing.” Lin, 1:56-58.

Lai further refines the battery-powered mechanical lifter of Lin. Lai expressly discusses its benefits in efficiency, power, and compactness over the prior art. Lai identifies an “ideal” electric stapling gun as being “energy saving, strong in hitting force and compact in size” and explains that its disclosed lifter member with two pins that engage two protrusions of the U-shaped member 61 leads to “1.8 times the compression of the prior art,” “provide the same hitting effect with less power consumption,” and be “smaller in size thereby increasing flexibility.” Lai, 1:9-10. 2:26-45.

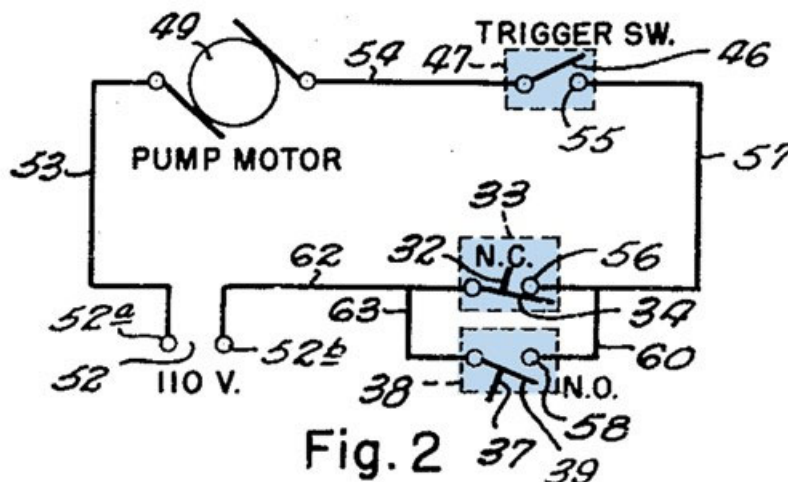
A POSITA would have solved Haley’s problem by incorporating Lai’s lifter member. Vallee, ¶67. Lai was a known solution to Haley’s identified problem of being bulky (solved by Lai’s use of a compact mechanical lifter) and risk of hydraulic fluid leaking (solved by Lai’s use of a mechanical, rather than hydraulic, lifter). A POSITA was able to implement Lai’s lifter member in Haley with predictable results. Vallee, ¶68. Lai teaches adding a “U-shaped member 61” with protrusions to the driver blade (as a modification to prior art such as Lin, which has a driver blade without protrusions) that can be engaged by pins 52A and 52B of Lai’s lifter member. Lai, 2:4-7. A POSITA would have understood that by adding

protrusions to Haley's driver blade it could be lifted by Lai's lifter member and would have achieved the same results predicted by Lai. Vallee, ¶68.

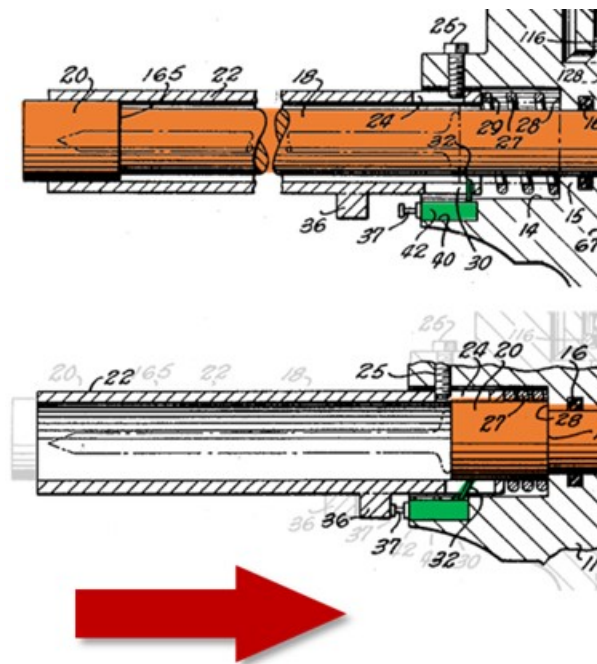
An additional, independent motivation to replace Haley's lifting mechanism with Lai's lifter were the market forces and design needs favoring a portable, battery-powered nailer. Vallee, ¶69. Artisans in the field had repeatedly highlighted the problems with prior nailer designs. *Id.*; Lin, 1:6-31 (discussing state of the art in 1989); Kondo, 1:9-44 (same for 1998); Pedicini, ¶¶[0003]-[0019] (same for 2006). Artisans noted over the years that corded power nailers (with a pneumatic air hose, an electrical power cable, or both) were not ideal because they lacked portability. Vallee, ¶69; Lin, 1:21-26; Kondo, 1:9-29; Pedicini, ¶[0005]. But the commercially-available portable power nailers were either combustion nailers (which required costly fuel and emitted waste fumes) or electrical flywheel nailers (which had low power output). Vallee, ¶69; Pedicini, ¶¶[0006]-[0007]. The clear and obvious solution presented by the prior art was to take the compressed gas spring design conceived by Haley and make it portable by implementing the battery-powered lifter member of Lai. Vallee, ¶70. The only missing piece was a reasonably-priced portable battery pack that could provide the power needed to make these off-the-shelf designs commercially feasible. *Id.* Battery technologies continued to advance, largely driven by smartphones and electric vehicles in the early 2000s, such that by the filing of the '954 patent, it was obvious to obtain a portable, battery-powered

nailer by combining Haley's compressed gas nailer design with Lai's battery-powered lifter member. *Id.* The compressed gas nailer claimed by the '954 patent was not unlocked by any innovation in the field of powered nailers, but rather was an obvious combination of old, off-the-shelf designs that was motivated by the market need for a battery-powered nailer and the market availability of suitable portable batteries. *Id.*

Here, Lai's lifter, "under first predetermined conditions, moves said movable driver toward a ready position." Haley discloses an "electric control circuit" in Fig 2 that receives input signals from "trigger switch 47" and "switches 33 and 38" (below, light blue) and thereby controls operation of the tool. Haley, 1:70-71, 2:59-63, Fig. 2. Haley states that "whenever one of the switches 33 or 38 is closed and the trigger switch is closed, the motor 49 will be connected across the input circuit 52 and will thus be energized." Haley, 3:5-8.



Switch 33 is “normally closed” and “has a contact 34 which is actuated by the operating arm 32 each time it is engaged by the hammerhead 20 to open the switch as the piston and the hammerhead are retracted inwardly.” Haley, 2:39-43. Thus, “as the drive piston is moved inwardly from the position illustrated in FIGURE 1 to the retracted or cocked position illustrated in FIGURE 3, the normally closed switch 33 is first opened and maintained open as long as the drive piston is in substantially its fully retracted position and the normally open switch 38 is closed as the guide barrel is moved to its fully retracted position.” Haley, 2:51-58, Figs. 1, 3.



The trigger switch 47 is closed by actuating the trigger. Haley, 4:47-52.

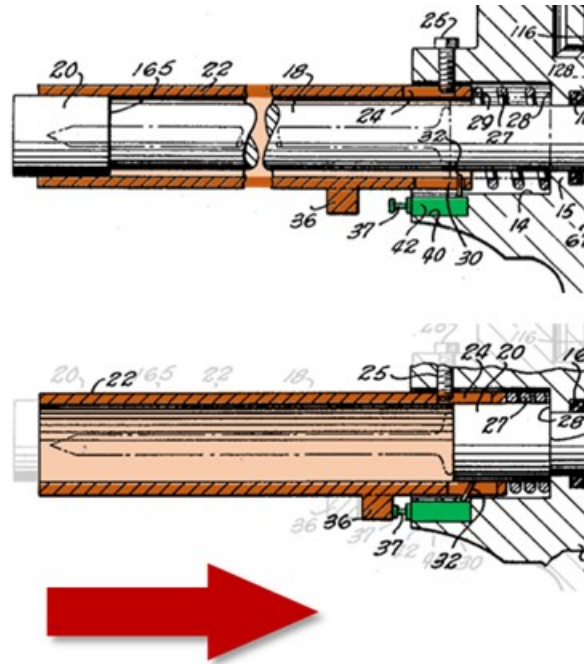
Under first predetermined conditions—that is, with the drive piston not yet raised to its retracted or cocked position and with the trigger actuated—Haley’s

circuit will provide power to its lifter to move the movable driver toward the ready position. Vallee, ¶¶71-74.

Element [1.6]

Haley discloses “wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.”

Switch 38 of Haley’s “electric control circuit” is closed by pressing the exit end against a workpiece. Haley states that “[t]he guide barrel also has external lug 36 which is adapted to engage the operator arm 37 of the normally open switch 38 to move the contact 39 thereof into closed position.” Haley, 2:43-46. Thus, “[w]hen the forward end of the guide barrel is then pressed against the work piece . . . the lug 36 engages the operating rod 37 of the normally open switch 38 and closes the switch so that the motor 49 is once again connected to the input circuit 52.” Haley, 5:74-6:7. This action is shown by Figures 1 and 3, below.



Thus, under second predetermined conditions (i.e., when the exit end pressed against a workpiece and with the trigger actuated) Haley’s circuit will “once again” provide power to its lifter and “the drive piston is now moved forcibly and with great velocity toward the left,” *i.e.*, the exit end, which “drives the nail into the workpiece or structure.” Haley, 6:22-26, 6:30-31; Vallee, ¶¶75-76.

In Haley, the pressurized gas of the storage chamber (“chamber 85”) and the cylinder (“extension cylinder 76”) act on the piston (“accumulator piston 71”) to form a gas spring for driving a nail during a drive stroke. Haley, Figs. 1, 4; 5:74-6:7; 6:7-26; 6:48-53; 7:6-13. When the accumulator piston 71 is moved upward in the cylinder extension 76, the compressed gas in the chamber increases from 1,000 psi to 2,000 psi—because the pressurized gas from the displacement volume of the cylinder (yellow) is pushed by the piston upward into in the cylinder and into the

Haley, 7:1-13, Figs. 1, 3.



2. *Claim 2*

The combination discloses “wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.” Haley’s movable driver (orange, below right) has an elongated shape with at least one longitudinal edge. Haley, Fig. 1; Vallee, ¶78. When replacing Haley’s hydraulic lifter with the claimed “lifter” taught by Lai, a POSITA would modify Haley’s driver to have protrusions so that they can be mechanically engaged by that lifter to move it through its return stroke. Vallee, ¶79. Lai teaches adding a “U-shaped member 61” with protrusions to the driver blade (as a modification to Lai’s prior art of record such as Lin, which has a driver blade without protrusions) that can be engaged by pins 52A and 52B of Lai’s lifter member. Lai, 2:4-7. A POSITA would have understood that by adding protrusions to Haley’s driver blade it could be lifted by Lai’s lifter member and would have achieved the same results predicted by Lai. Vallee, ¶79. The particular “U-shaped member 61” that Lai teaches to add to the driver includes a plurality (two) of spaced-apart protrusions (blue, below left) along a longitudinal edge. Lai, Fig. 3; Vallee, ¶79. The combination would result in a movable driver having an elongated shape and longitudinal edge, and with a plurality of protrusions located along the longitudinal edge and spaced-apart from one another.

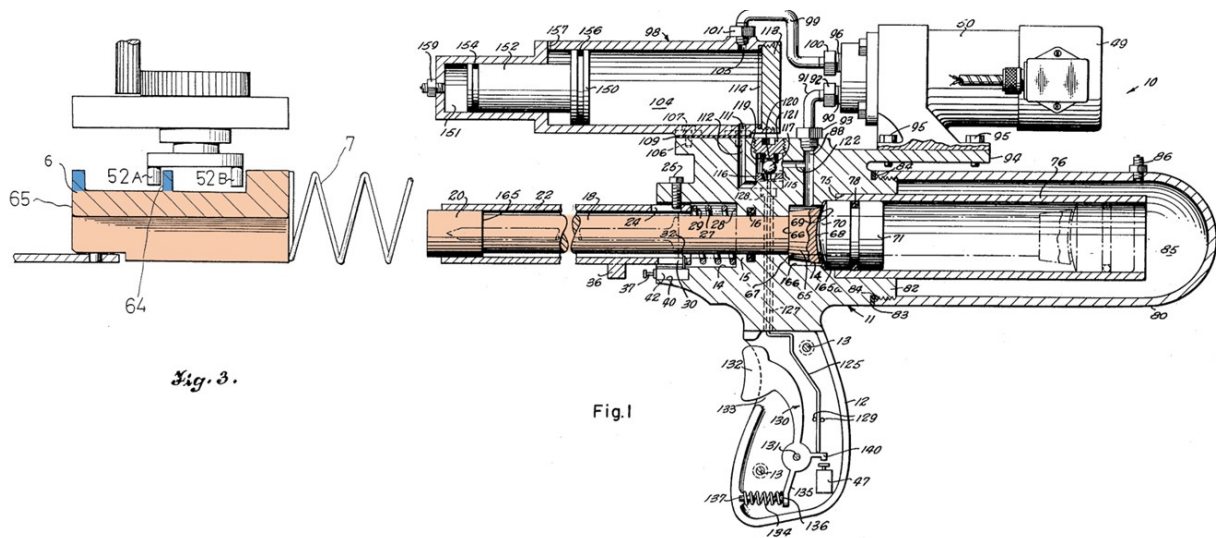


Fig. 3.

Fig. 1

3. Claim 3

The combination discloses “wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said movable driver and forces said movable driver to move toward its ready position, using a rotary-to-linear motion.”

The lifter taught by Lai includes a disk (“cam 5,” yellow) with two extensions protruding from its surface (pins 52A and 52B, green), which moves the movable driver (orange) toward its ready position under first predetermined conditions (*see* Element [1.5]). Lai, Fig. 3, 2:13-21; Vallee, ¶81.

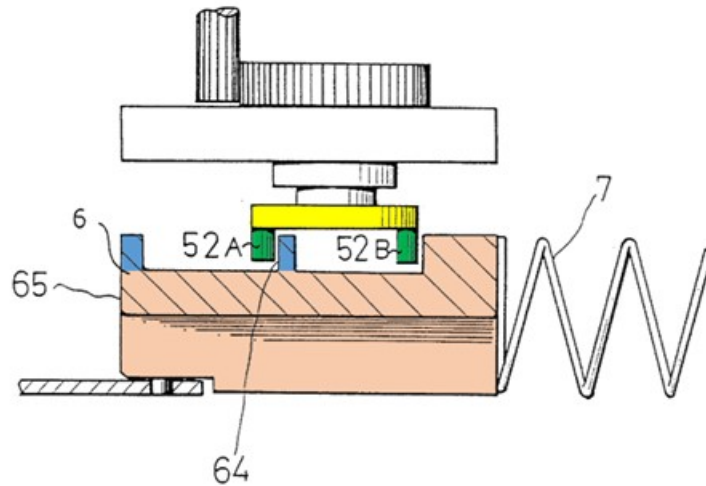


Fig. 3.

The lifter taught by Lai moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Lai, Figs. 4A-D, 1:62-63, 2:14-25.

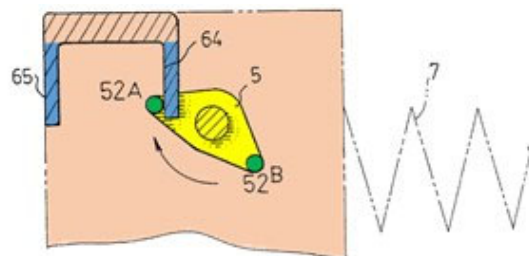


Fig. 4A.

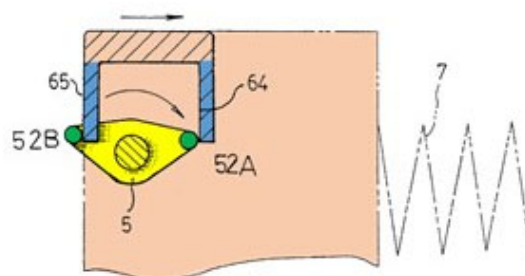


Fig. 4B.

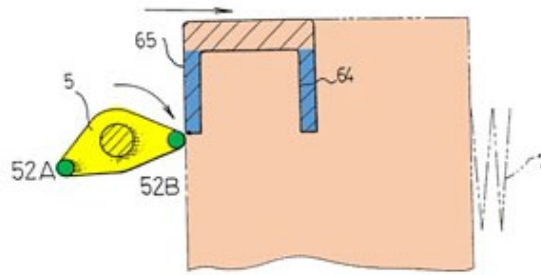


Fig. 4C.

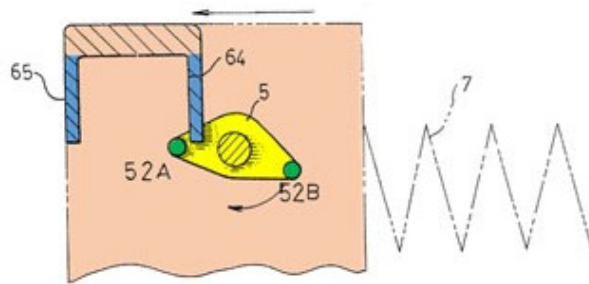


Fig. 4D.

4. Claim 4

Element [4.1]

Element 4.1 is identical to Element 2 and is met as described above.

Element [4.2]

The combination discloses “such that said at least one extension of said lifter fits in a space between said spaced-apart plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby causing said movable driver to move in a substantially linear direction within a driver track of said guide body.”

The lifter taught by Lai includes extensions protruding from its surface (pins 52A and 52B, green) that fit between the spaced-apart protrusions of the driver (blue). Lai, Fig. 3, 2:13-21; Vallee, ¶84.

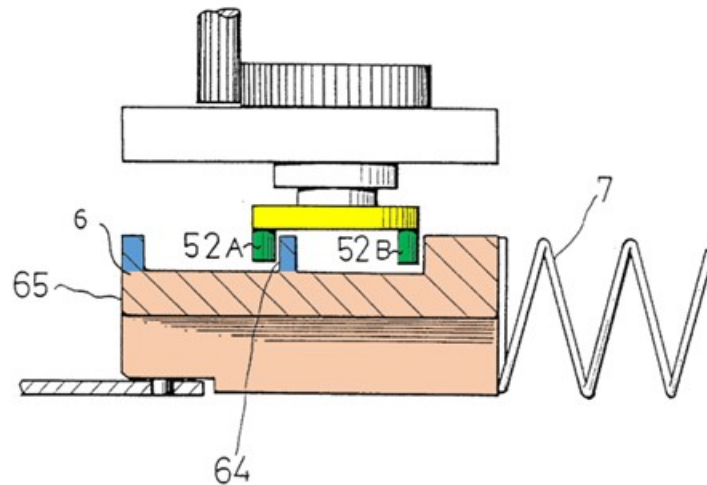


Fig. 3.

The lifter is rotated (curved arrows) such that its extensions (green) engage the protrusions on the driver (blue) to cause the driver (orange) to move in a linear direction (straight arrow) within the driver track of the guide body. Lai, Figs. 4A-D, 1:62-63, 2:14-25; Vallee, ¶85.

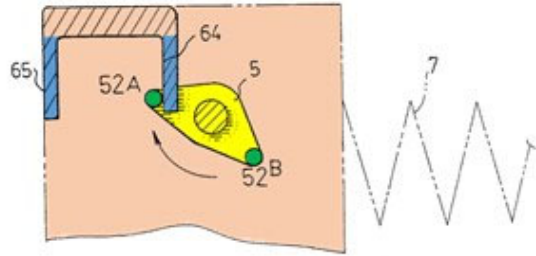


Fig. 4A.

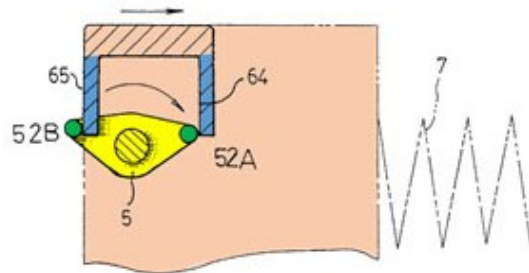


Fig. 4B.

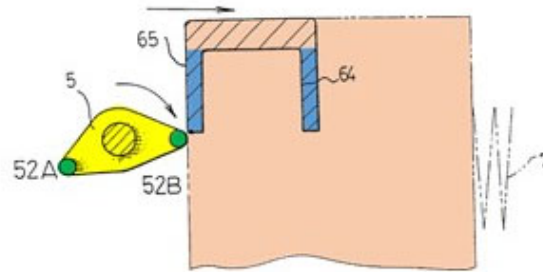


Fig. 4C.

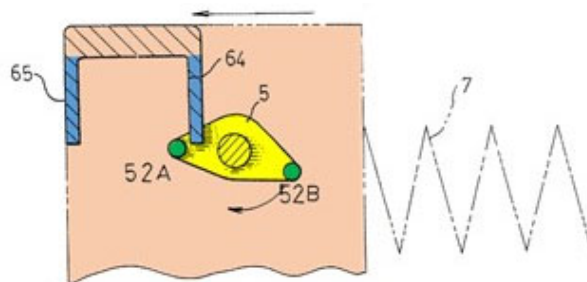
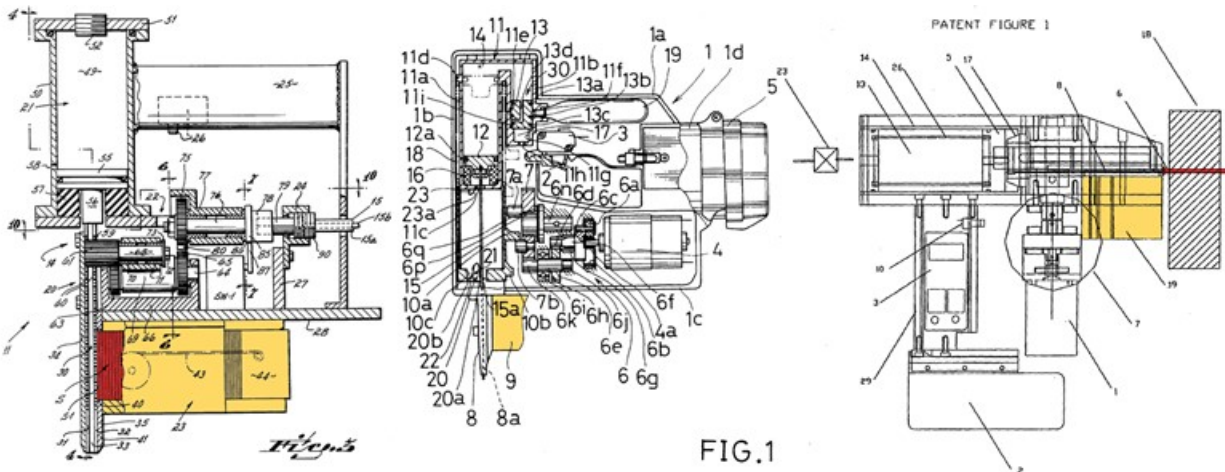


Fig. 4D.

5. *Claim 5*

Haley does not explicitly disclose “a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.” However, it was obvious to include a magazine that provides nails below the driver such that they are pushed out the exit of the driver track during a drive stroke.

Magazines that feed fasteners (such as nails) below the driver to be pushed out the exit during a drive stroke had become a ubiquitous component of powered nailers by the time of the '954 patent, which customers would have expected and required to be included. Vallee, ¶87. This is reflected by the fact that all three prior art references expressly discussed in the specification of the '954 patent (1:48-67) included such a magazine. *See* U.S. Patent No. 4,215,808 (“Sollberger”), Fig. 3 (“magazine 23,” below left), 5:65-6:5; Kondo, Fig. 1 (“nail magazine 9,” below middle), 5:15-23; Pedicini, Fig. 1 (“fastener feeder (19),” below right), ¶[0077]. It was obvious for a POSITA to include such a magazine due to market forces and design incentives. Vallee, ¶87.



6. Claim 6

The combination discloses “wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driver.” Haley’s hollow cylinder (“cylinder extension 76”) is the sole cylinder containing pressurized gas. While Haley does have a separate cylindrical “large chamber 104,” that chamber is used as a reservoir for hydraulic fluid of Haley’s lifting mechanism. Vallee, ¶188. In the combination with Lai, Haley’s “large chamber 104” would be eliminated as unnecessary because the hydraulic fluid would not be needed for Lai’s lifter member.

7. Claim 7

The language of claim 7 conflicts with that of its base claim 1. Claim 1 calls for the driver to be moved toward the “ready position” under the “first” predetermined conditions and moved toward the “driven position” under the “second” predetermined conditions. In contrast, claim 7 calls for the driver to be moved toward the “driven position” under the “first” predetermined conditions and

moved toward the “ready position” under the “second” predetermined conditions. In the event that this contradiction is held to be a correctable error (rather than rendering claim 7 indefinite), then this element is disclosed by Haley as explained above in relation to Elements 1.5-1.6.

8. *Claim 8*

Elements [8.P]-[8.4], [8.6] and [8.9]

Elements 8.P-8.2, 8.4, 8.6 and 8.9 are identical to Elements 1.P-1.2 and 1.4-1.6, respectively, and are met as described above. Element 8.3 is substantially identical to Element 1.3 and met as described above,

Element [8.5]

The combination discloses “an on-board electrical energy source, with no external energy source attached to said fastener driving tool.” Lai’s lifter receives motive power from a motor (“motor 3”). Lai, 2:14-16. Lai’s motor is powered by an on-board electrical power source (Lai’s battery 2), so there is no external energy source attached. Lai, Figs. 1-2, 1:25-35, 1:44-54, 1:60-62, 2:2; Vallee, ¶¶94-95.

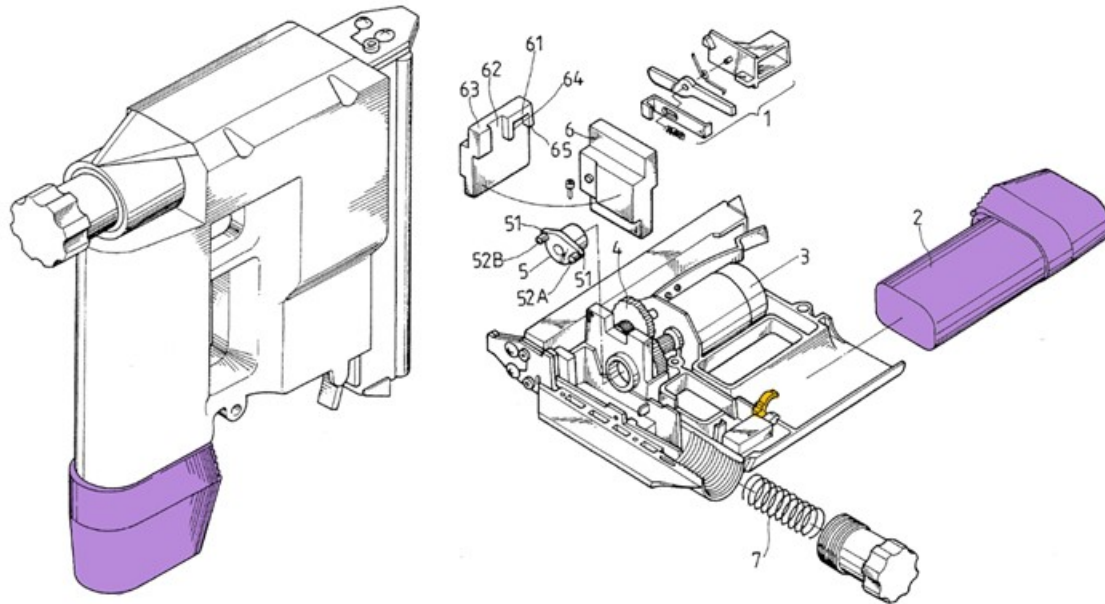


Fig. 1.

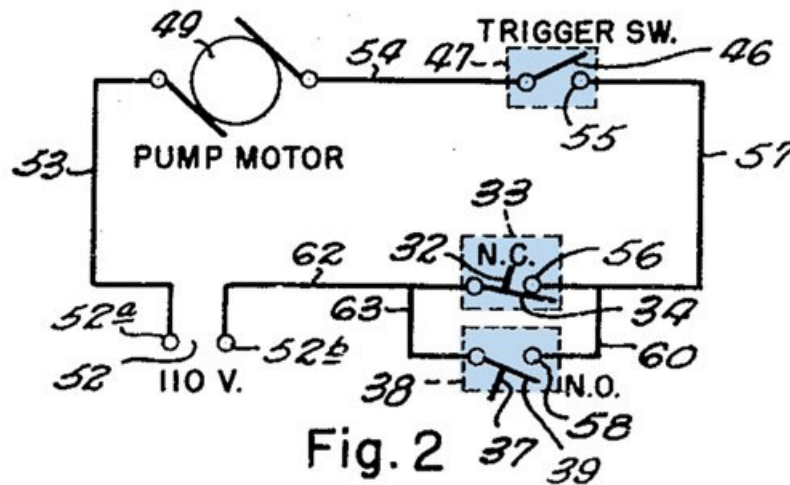
F I G. 2

This combination is spurred on by the need for a portable, battery-powered nailer, and Lai both teaches and encourages its energy-efficient and compact lifting mechanism powered by its portable battery pack. *See* Element 1.5. Accordingly, in this combination, Haley’s electrical cable is replaced with Lai’s portable battery (Lai’s battery 2), and there would be no external energy source. Vallee, ¶96.

Element [8.7]

The combination discloses “a prime mover that is powered by said on-board electrical energy source, said prime mover causing said lifter to move, under first predetermined conditions.” Lai’s lifter is moved by a prime mover (“motor 3”) powered by the on-board electrical energy source (Lai’s battery 2). Lai, Figs. 1-2, 1:25-35, 1:44-54, 1:60-62, 2:2, 2:14-16; Vallee, ¶¶97-99.

Haley's "electric control circuit" in Fig 2 would control the connection between Lai's prime mover ("motor 3") and its on-board electrical energy source (Lai's battery 2) according to input signals from "trigger switch 47" and "switches 33 and 38" (below, light blue). Haley, 1:70-71, 2:59-63, 3:5-8, Fig. 2.

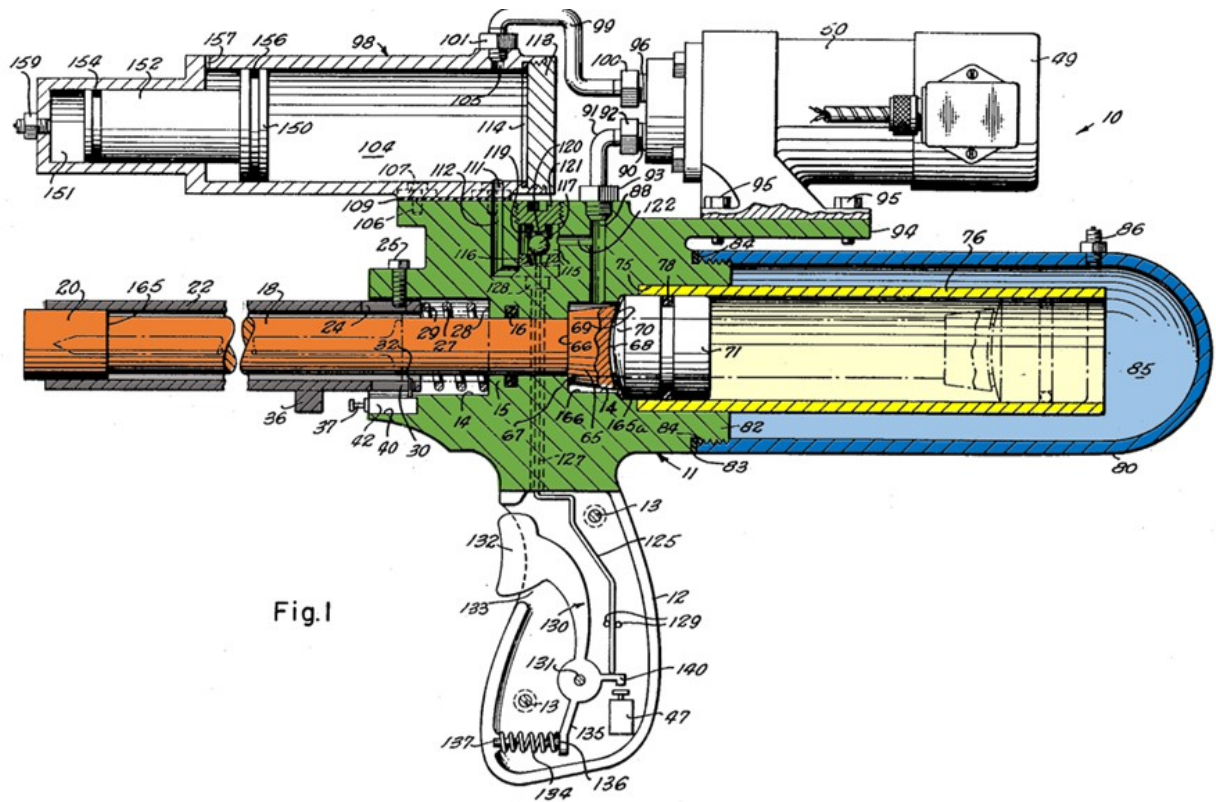


Haley's circuit is closed, and thus supplying power from the battery to the motor and causing the lifter to move, under the "first predetermined conditions," where the drive piston is not yet raised (switch 33 remains "normally closed" and not yet opened, Haley, 2:39-43, 2:51-58, Figs. 1, 3) and the trigger is actuated (trigger switch 47 is closed, Haley, 4:47-52).

Element [8.8]

The combination discloses "a housing that holds said hollow cylinder, guide body, movable driver, storage chamber, on-board electrical energy source, lifter, and prime mover as a single, portable hand-operable tool."

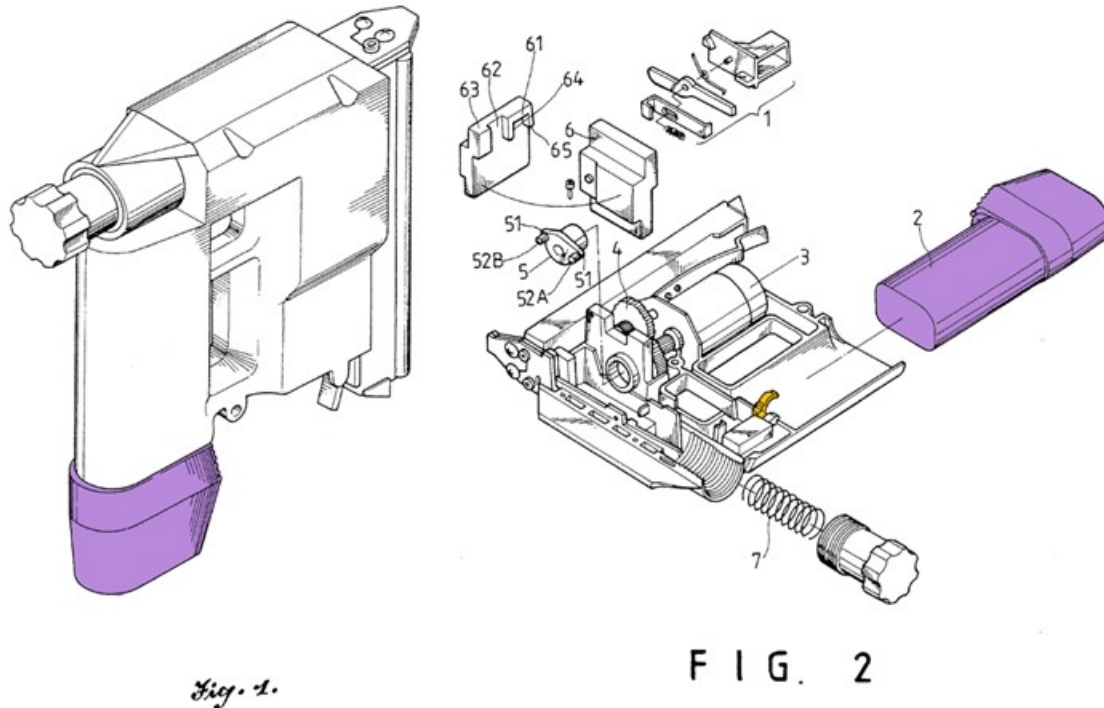
Haley's housing ("housing 40," green) holds, as a single, portable hand-operable tool, its hollow cylinder ("extension cylinder 76," yellow), guide body ("guide barrel 22," grey), movable driver ("drive piston 18," orange), and storage chamber ("chamber 85," blue). Haley, 2:47, Fig. 1. Haley's housing will also include Lai's on-board electrical energy source (battery 2), lifter ("cam 5"), and prime mover ("motor 3").



9. Claim 9

The combination discloses "wherein said on-board electrical energy source comprises a battery." Lai's on-board electrical energy source is a detachable battery

(battery 2, purple) with an internal attachment clip (orange). Lai, Figs. 1-2; Vallee, ¶101.



10. Claim 10

The combination discloses “wherein said prime mover comprises an electric motor.” Lai’s prime mover (“motor 3”) is powered by an electrical power source (battery 2) and thus is an electric motor. Lai, 1:25-35, 1:44-54, 1:60-62, 2:2; Vallee, ¶102.

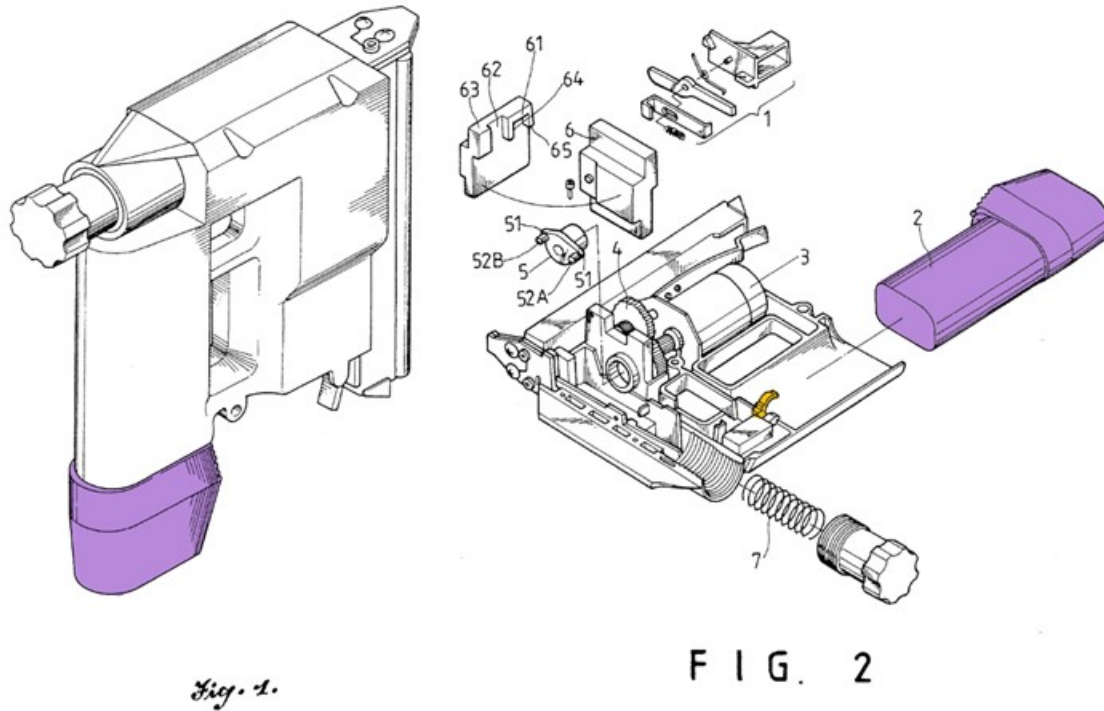
11. Claim 11

Claim 11 is identical to Claim 7 and is met as described above.

12. Claim 12

The combination discloses “wherein said prime mover is powered by an electrical power supply that is carried on said tool.” Lai’s on-board electrical energy

source that powers the prime mover is an electrical battery (battery 2, purple). Lai, Figs. 1-2; Vallee, ¶104.



13. Claims 13-17

Claims 13-17 are identical to Claims 2-6, respectively, and are met as described above.

14. Claim 18

Elements [18.P]-[18.4] and [18.6]

Elements 18.P-18.4 and 18.6 are identical to Elements 1.P-1.4 and 1.6, respectively, and are met as described above.

Element [18.5]

Element 18.5 is met as described above for Element 1.5.

In the combination, Lai's lifter includes a rotating disk ("cam 5," yellow) that moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Lai, Figs. 4A-D, 1:62-63, 2:14-25.

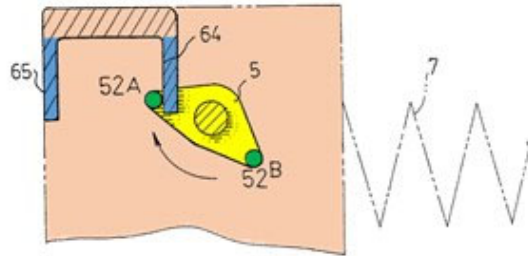


Fig. 4A.

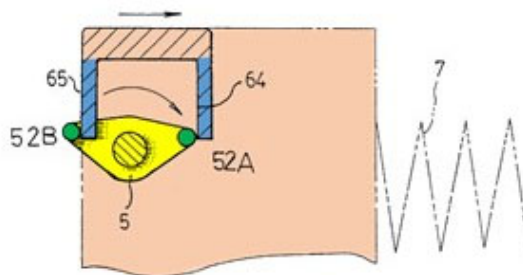


Fig. 4B.

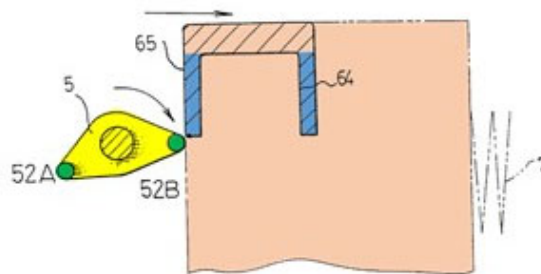


Fig. 4C.

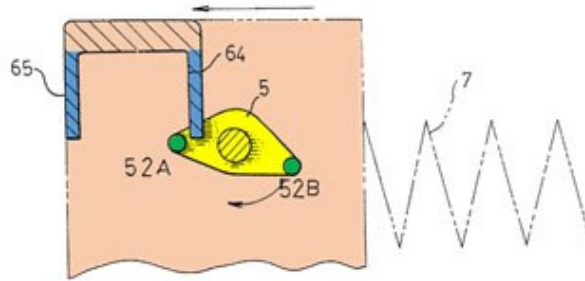


Fig. 4D.

15. Claims 19-20

Claim 19 is identical to Claim 2 and is met as described above. Claim 20 is substantially identical to Claim 3 and is met as described above.

B. Ground 2: Claims 1-20 are Obvious based on Saari and Enstrom in view of Lai

U.S. Patent Nos. 3,924,692 (“Saari”) and 3,913,685 (“Enstrom”) are closely related patents that were filed on the same day and given sequential application numbers, assigned to the same company, have identical titles and terminology, and contain overlapping specifications and figures. *See* Saari, Enstrom. Because of the close relationship between Saari and Enstrom, a POSITA would look to their collective teachings together and would have combined them as a matter of course. Vallee, ¶46. To the extent there are aspects described in only one of Enstrom or Saari, a POSITA would understand that is simply due to their separate focuses on different inventive aspects of the tool (warranting the separate patents for different inventors). Vallee, ¶46. Saari describes the switching means for controlling the fastener driving tool (Saari, 1:48-57, 3:19-68, Figs. 7-9), whereas Enstrom describes

the lifting mechanism and compressed gas chamber for that tool (Enstrom, 2:35-3:19, Figs. 6-7). Accordingly, a POSITA would combine the two teachings to achieve the complete tool worked on by Enstrom and Saari. Vallee, ¶¶45-47. Saari and Enstrom are treated as such below.

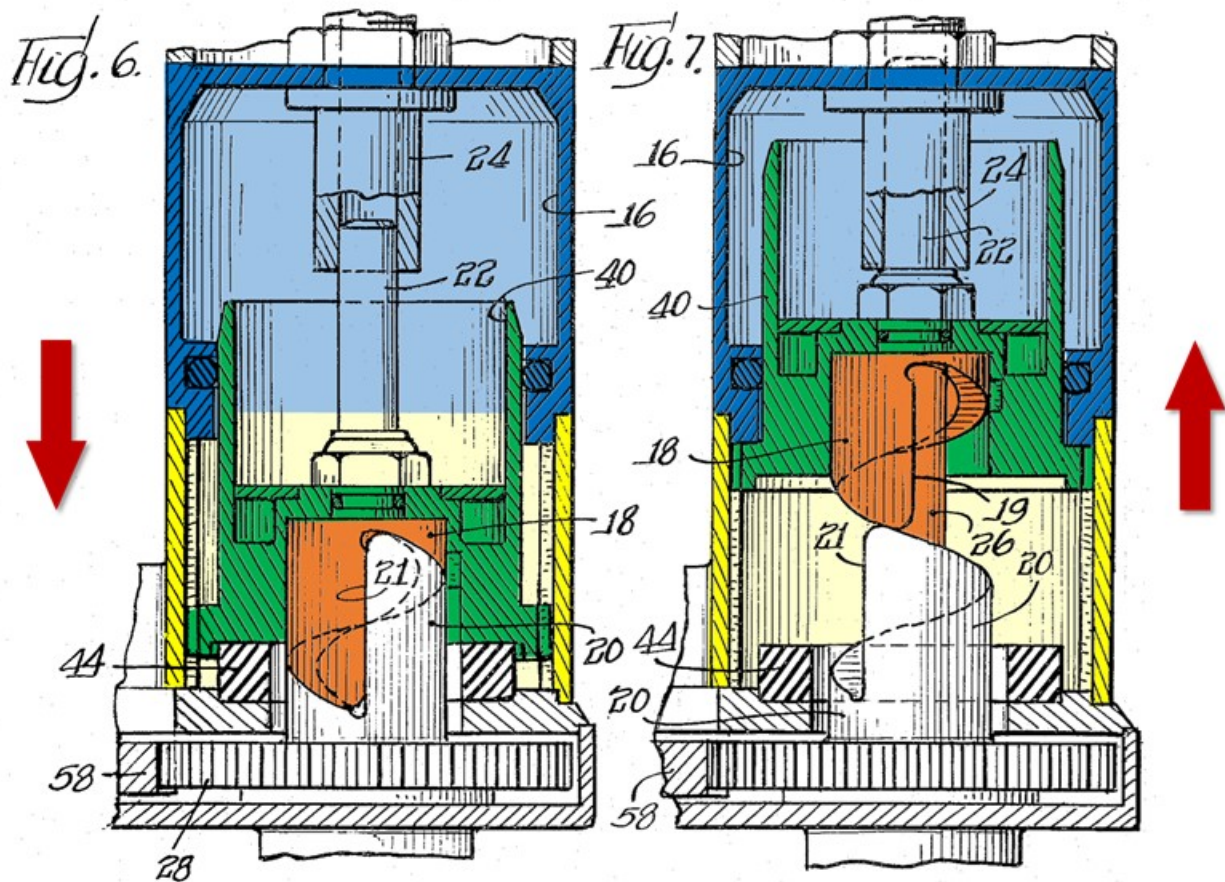
1. Claim 1

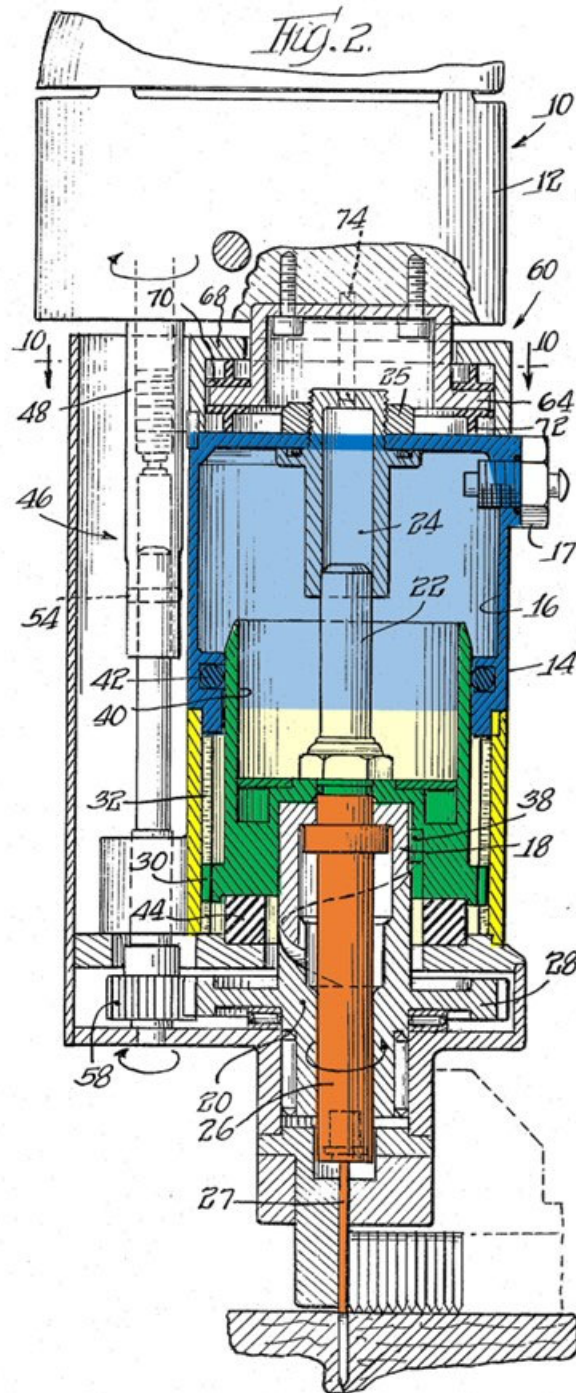
Element [1.P]

Saari/Enstrom discloses “[a] fastener driver adapted for use in a fastener driving tool.” Saari/Enstrom disclose a “driving tool” with a spring (including a compressed gas spring) to “provide the actual driving force to seat the fastener.” Saari, 1:27-33; Enstrom, 1:27-32.

Element [1.1]

Saari/Enstrom discloses “a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston.” Saari/Enstrom’s hollow cylinder (yellow) contains a piston (“cup-like piston 40”) movable within the cylinder along “key and spline devices 30 and 32.” Enstrom, 2:52-60, Figs. 2, 6-7; Saari, 4:1-9, Fig. 10.



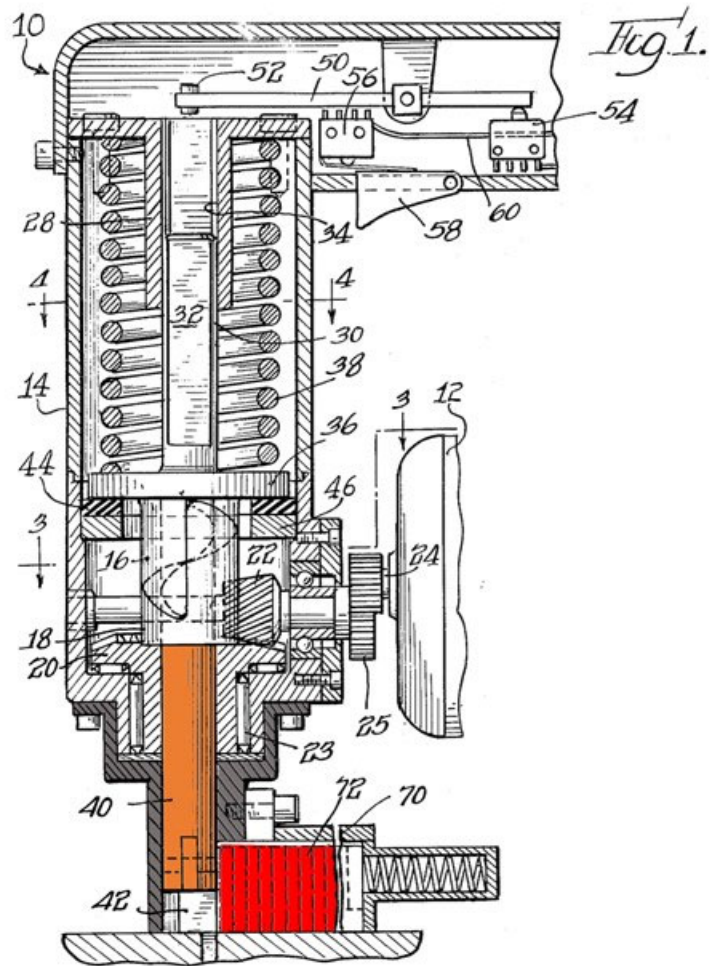
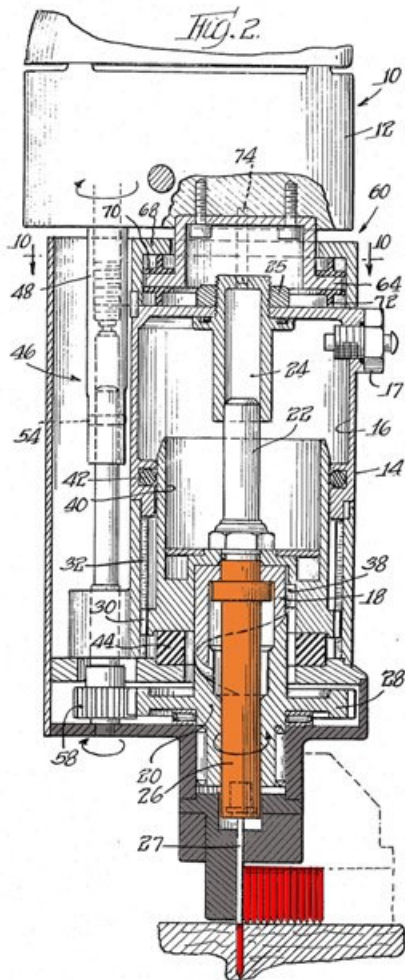


The hollow cylinder includes a displacement volume, which is the portion cylinder's volume within the "cup" of the "cup-like piston 40" when it is at its lower

position (light yellow in Fig. 6), which the piston moves through when it is raised to its upper position (Fig. 7).

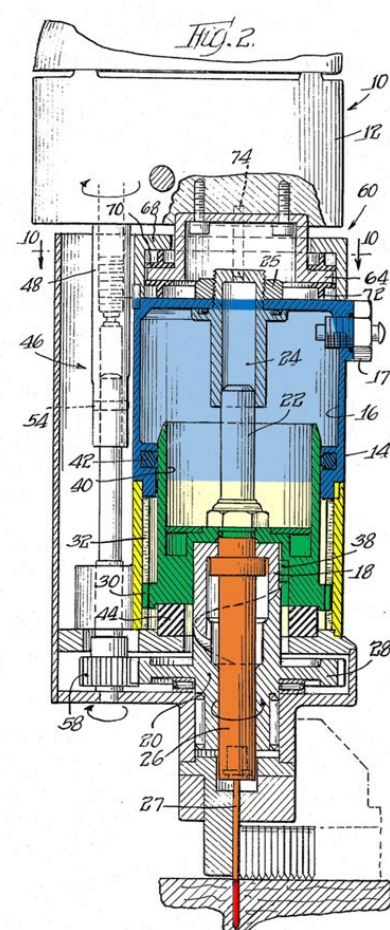
Element [1.2]

Saari/Enstrom discloses “a guide body that is sized and shaped to receive a fastener that is to be driven.” Saari/Enstrom’s guide body (grey) has a linear passageway for the driver (26/40, orange) and is sized and shaped to receive a fastener that is to be driven (“fastener member 72,” red). Enstrom, Fig. 2; Saari, Fig. 1.



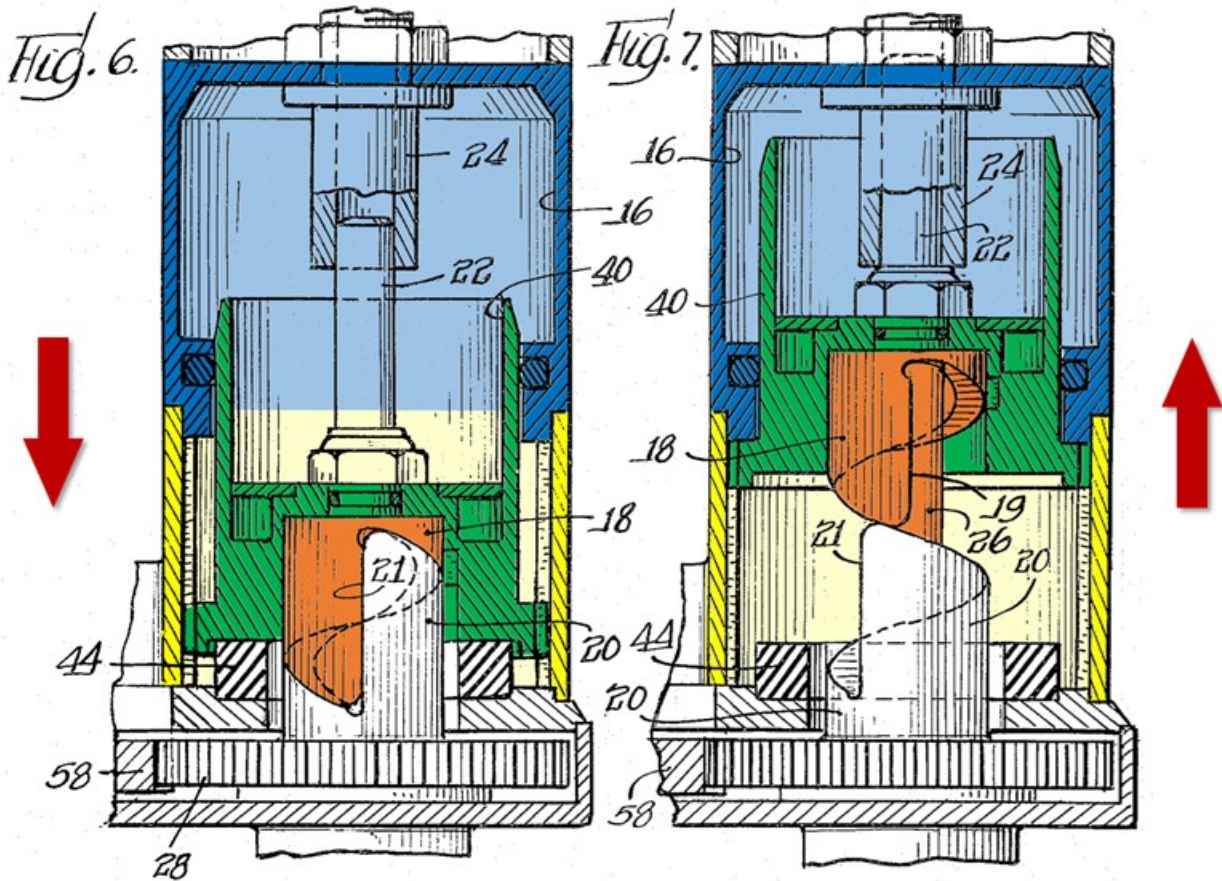
Element [1.3]

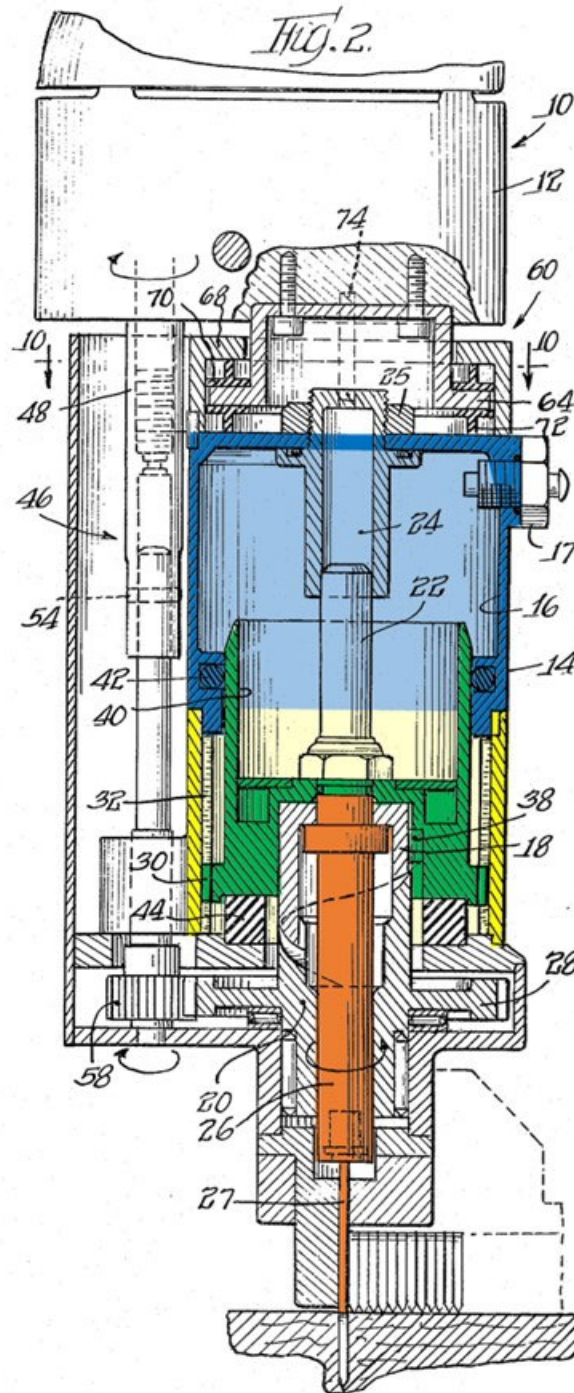
Saari/Enstrom discloses “a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body.” Saari/Enstrom has a movable driver (“upper cam 18 and associated ram 26,” orange) that is in communication with its piston (“cup-like piston 40,” green) and that is sized and shaped to push the fastener (red) from the guide body. Enstrom, 2:55-59, Figs. 2, 6-7; Saari, 2:51-54, Figs. 1-2.



Element [1.4]

Saari/Enstrom discloses “a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder.” Saari/Enstrom refers to its storage chamber, which contains pressurized gas, as “chamber 16” (blue). Enstrom, 2:35-39, Figs. 1, 6-7; Saari, 4:1-9, Fig. 10. Saari/Enstrom’s storage chamber 16 is distinct from the cylinder (yellow), which is shown in Figure 1.





Saari/Enstrom's storage chamber and said displacement volume are "initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than

one driving cycle.” Saari states that “valve 86 is provided for selectively charging the chamber with the appropriate compressible gas,” which “will thus allow the compressibility of the spring to be conveniently varied.” Saari, 4:11-14, Fig. 10; *see* Enstrom, Fig. 2. Saari also states that “[t]he gas chamber is sealed by suitable seal means 84 between the inner walls of the housing 14a and the outer side walls of the piston 80.” Saari 4:6-9, Fig. 10; *see* Enstrom, 2:52-55, Figs. 1, 6-7. A POSITA would understand the disclosure of a sealed main storage chamber and a valve for “selectively charging the chamber” means that the chamber is both “initially charged with a pressurized gas” and that it will “remain above atmospheric pressure during all portions of an operating cycle,” since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶¶117-118. Saari/Enstrom explicitly denigrate pneumatic devices that “require[] convenient sources of compressors and air hoses which makes a tool undesirable for the various remote locations required on a construction site.” Saari, 1:9-15; Enstrom, 1:7-13.

Element [1.5]

The combination of Saari/Enstrom and Lai discloses “a lifter that, under first predetermined conditions, moves said movable driver toward a ready position.” Saari/Enstrom discloses a lifting mechanism with “a pair of coacting helicoidal cams 18 and 20,” where the “[t]he lower cam 20 will be rotatably mounted within the housing and serves as the driving cam. Enstrom, 2:32-39, Figs. 1 and 6-7.

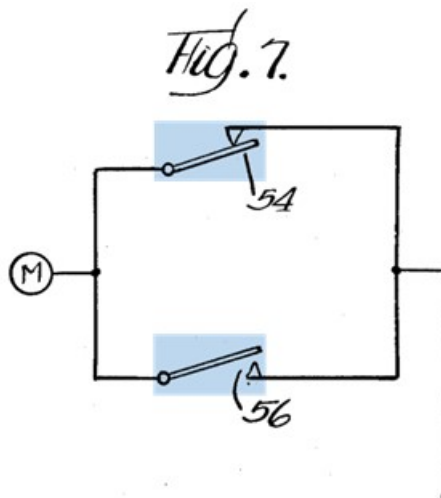
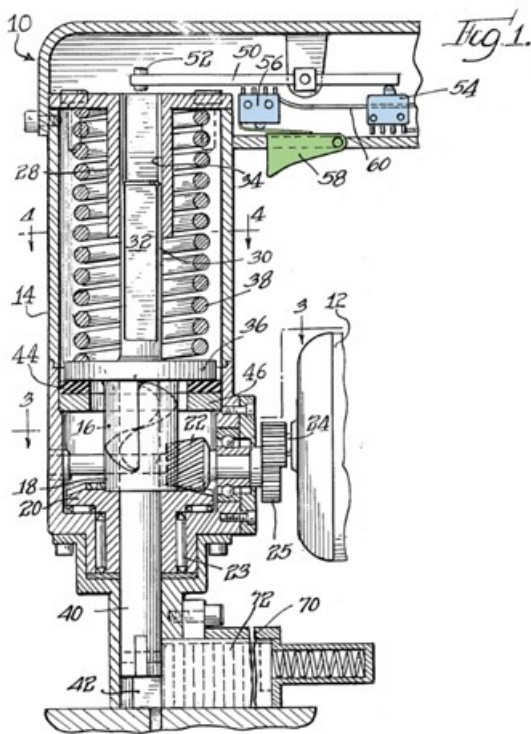
Saari/Enstrom's lifting structure ("cam 20") moves a movable driver ("upper cam 18 and associated ram 26"), which is connected to the piston ("cup-like piston 40"), through a return stroke ("a purely axial rearwardly motion"). Enstrom, 2:55-59, Figs. 6-7; *see* Saari, 2:51-54, Figs. 1-2. It was obvious to replace Saari/Enstrom's helicoidal lifting mechanism with the claimed "lifter," which is disclosed by Lai as explained above in relation to the combination of Haley with Lai. *See* §I.A.1.

A POSITA was motivated to replace Saari/Enstrom's helicoidal lifting mechanism with Lai's lifter member. Saari/Enstrom's lifting mechanism had a known problem in that it was designed to be used in a corded tool with access to AC power from an electrical outlet. Vallee, ¶¶120-124; *see* Enstrom, Fig. 1 (power cord 34). At the filing of the '954 patent, market forces and design needs favored a portable, battery-powered nailer. Vallee, ¶¶120-121. Artisans repeatedly noted over the years that corded power nailers (with a pneumatic air hose, an electrical power cable, or both) were not ideal because of their lack of portability. Vallee, ¶120; Lin, 1:21-26; Kondo, 1:9-29; Pedicini, ¶[0005].

Lai discloses a battery-powered nailer (*see* §I.A.1) and touts its electrical efficiency. Lai identifies an "ideal" electric stapling gun as being "energy saving" and explains that its disclosed lifter member can "provide the same hitting effect with less power consumption." Lai, 1:9-10. 2:34-42. A POSITA would have replaced Saari/Enstrom's helicoidal lifting mechanism with Lai's lifter member in

order to eliminate the electrical power cable and achieve a portable, battery-powered nailer. Vallee, ¶121.

In this combination, Lai's lifter would "under first predetermined conditions, moves said movable driver toward a ready position." Saari/Entrom discloses a circuit that supplies power to the motor ("M" in Fig. 7) and receives input signals from (1) "switch 54" (below, light blue), which is opened by guide shaft 30 engaging pivot arm 50 when driving ram 40 is raised to its cocked position; and (2) "switch 56" (light blue), which is closed by actuation of trigger 58 (light green). Saari, 3:19-63, Fig. 1, 7-9.



Under first predetermined conditions—that is, with the driving ram 40 not yet raised to its cocked position and switch 54 therefore still closed—Saari/Enstrom's

circuit will provide power to the lifter to move the movable driver toward the ready position. Vallee, ¶¶122-123.

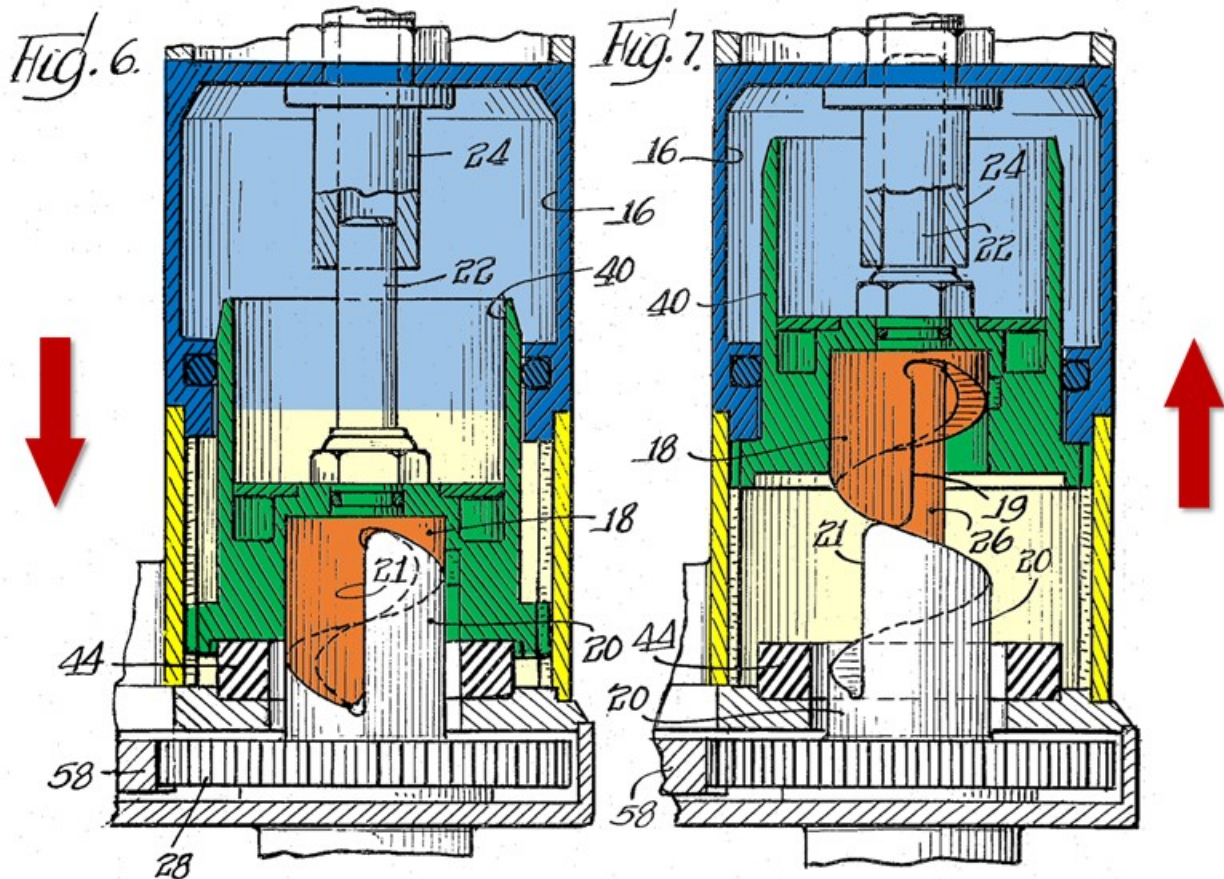
Element [1.6]

Saari/Enstrom discloses “wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.”

Under second predetermined conditions—that is, with switch 54 opened due to driving ram 40 being raised to its cocked position and switch 56 closed by actuation of trigger 58—Saari/Enstrom’s circuit will “start[] the motor to slightly rotate the lower cam 20 from the position shown in FIG. 2 until the drop-off portions of the cam are aligned.” Vallee, ¶124; Saari, 3:55-58, Fig. 9. Further rotation will then cause the driver member (“driving ram 40”) to “be driven forcefully downwardly” where it will “contact a fastener member 72 fed beneath the striker 42 on the extremity of the ram,” and thereby move the movable driver toward the driven position. Vallee, ¶124; Saari, 2:56-63.

In Saari/Enstrom, the cylinder (yellow below) and piston (“cup-like piston 40,” green) act as a gas spring during the drive stroke and the pressurized gas of both said storage chamber (blue) and the displacement volume (light yellow) act on the piston. When the cup-like piston 40 is raised, the gas in the displacement volume of

the cylinder within the cup of piston (yellow below) and the gas in chamber 16 (blue) are compressed, and the ram is then “driven downwardly under the bias of the compressed gas.” Vallee, ¶125; Enstrom, 2:45-46, Figs. 6-7; Saari, Fig. 10.

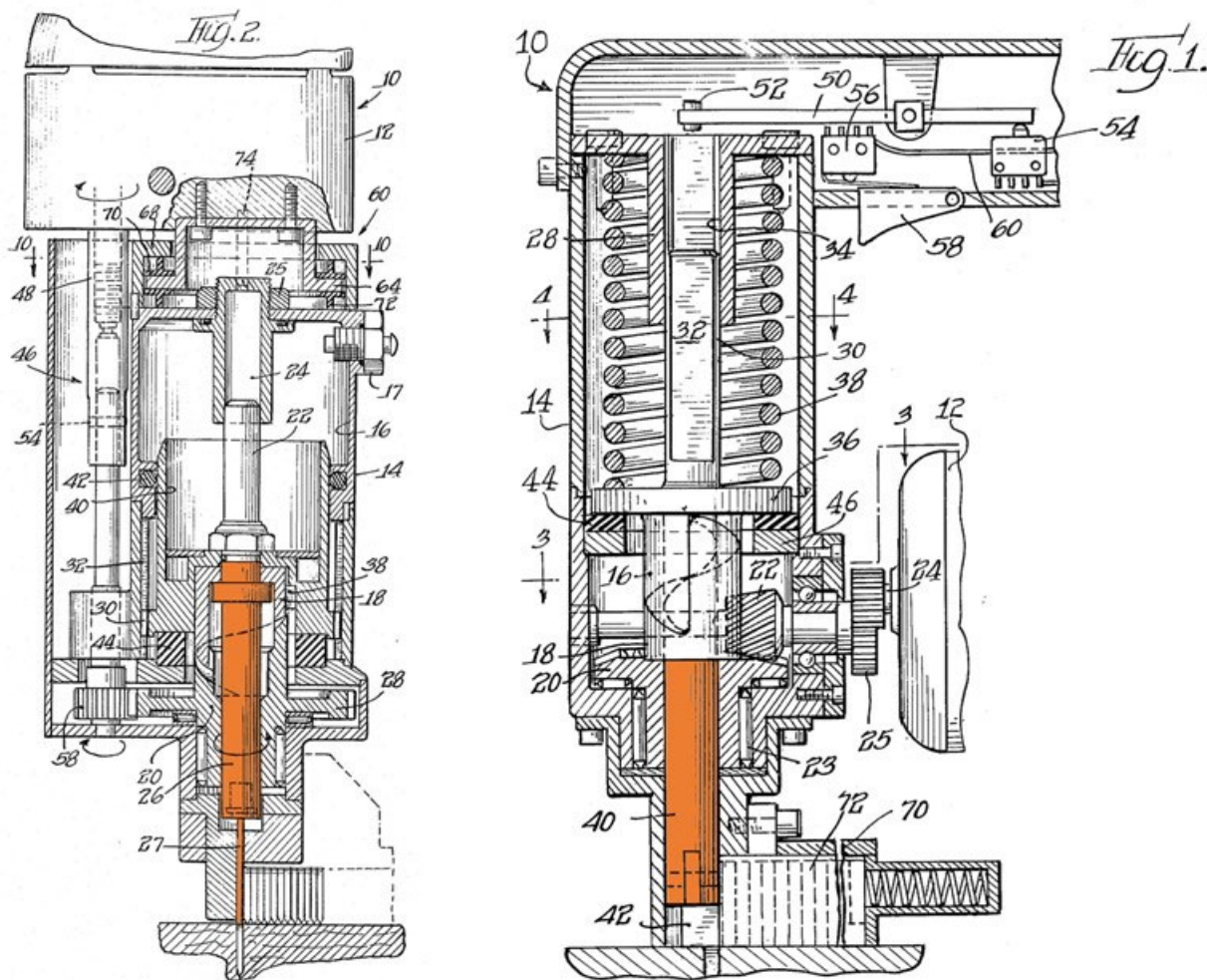


2. Claim 2

The combination discloses “wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.” Saari/Enstrom’s movable

driver (orange, below) has an elongated shape with at least one longitudinal edge.

Enstrom, Fig. 2; Saari, Fig. 1; Vallee, ¶126.



When replacing Saari/Enstrom’s helicoidal lifting mechanism with the claimed “lifter” taught by Lai, a POSITA would modify Saari/Enstrom’s driver to have protrusions so that they can be mechanically engaged by that lifter to move it through its return stroke. Vallee, ¶127. Lai teaches adding a “U-shaped member 61” with protrusions to the driver blade (as a modification to Lai’s prior art of record such as Lin, which has a driver blade without protrusions) that can be engaged by

pins 52A and 52B of Lai's lifter member. Ex. 1005 [Lai], 2:4-7. In the same way, POSITA would have understood that by adding protrusions to Saari/Enstrom's driver blade it could be lifted by Lai's lifter member and would have achieved the same results predicted by Lai. Vallee, ¶127. The particular "U-shaped member 61" that Lai teaches to add to the driver includes a plurality (two) of spaced-apart protrusions (blue) along a longitudinal edge. Lai, Fig. 3; Vallee, ¶127. Thus, the combination would result in a movable driver having an elongated shape and longitudinal edge, and with a plurality of protrusions located along the longitudinal edge and spaced-apart from one another.

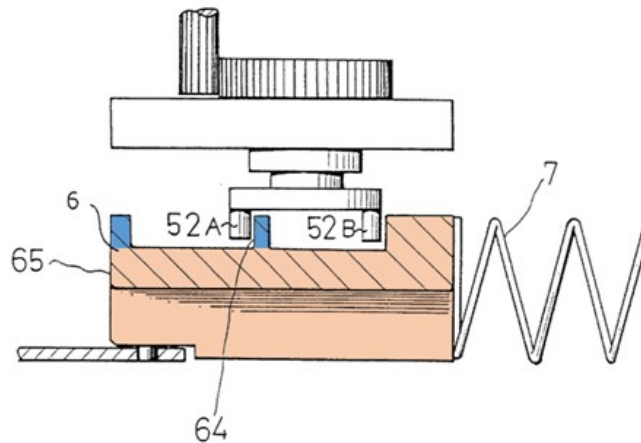


Fig. 3.

3. *Claim 3*

The combination discloses "wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first

predetermined conditions, contacts said movable driver and forces said movable driver to move toward its ready position, using a rotary-to-linear motion.”

Here, the lifter taught by Lai includes a disk (“cam 5,” yellow below) with two extensions protruding from its surface (pins 52A and 52B, green), which moves the movable driver (orange) toward its ready position under first predetermined conditions (*see* Element [1.5]). Lai, Fig. 3, 2:13-21; Vallee, ¶¶ 128-129.

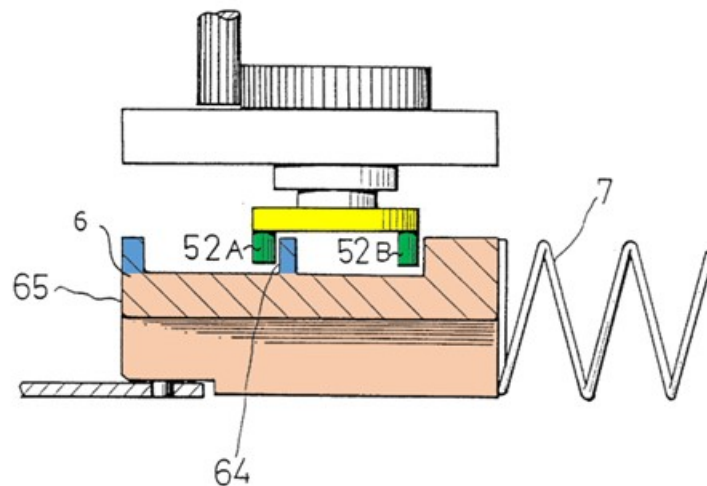


Fig. 3.

The lifter taught by Lai moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Lai, Figs. 4A-D, 1:62-63, 2:14-25.

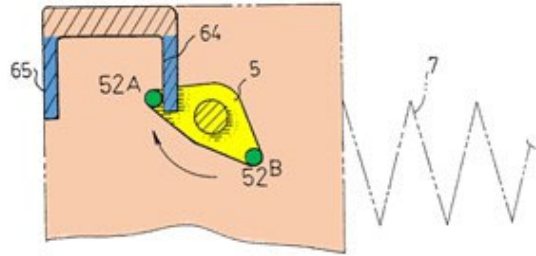


Fig. 4A.

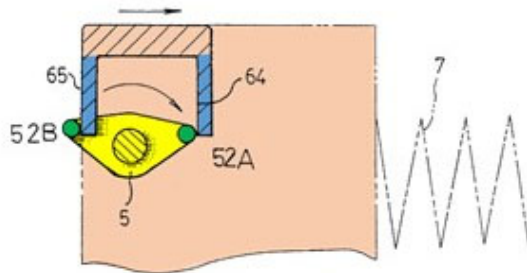


Fig. 4B.

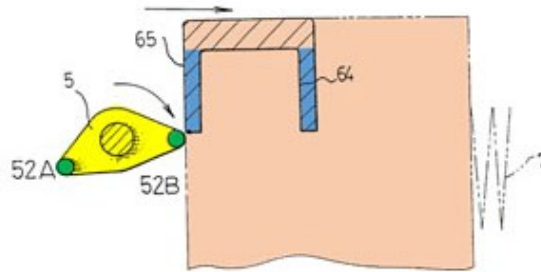


Fig. 4C.

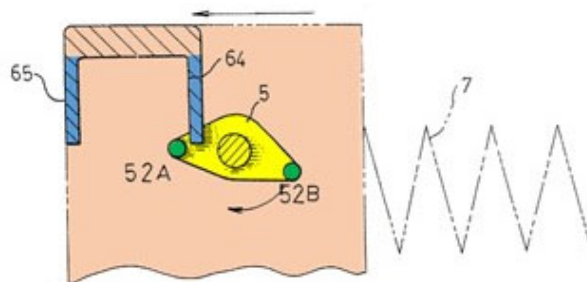


Fig. 4D.

4. Claim 4

Element [4.1]

Element 4.1 is identical to Element 2 and is met as described above.

Element [4.2]

The combination discloses “such that said at least one extension of said lifter fits in a space between said spaced-apart plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby causing said movable driver to move in a substantially linear direction within a driver track of said guide body.”

Here, the lifter taught by Lai includes extensions protruding from its surface (pins 52A and 52B, green) that fit between the spaced-apart protrusions of the driver (blue). Lai, Fig. 3, 2:13-21; Vallee, ¶131.

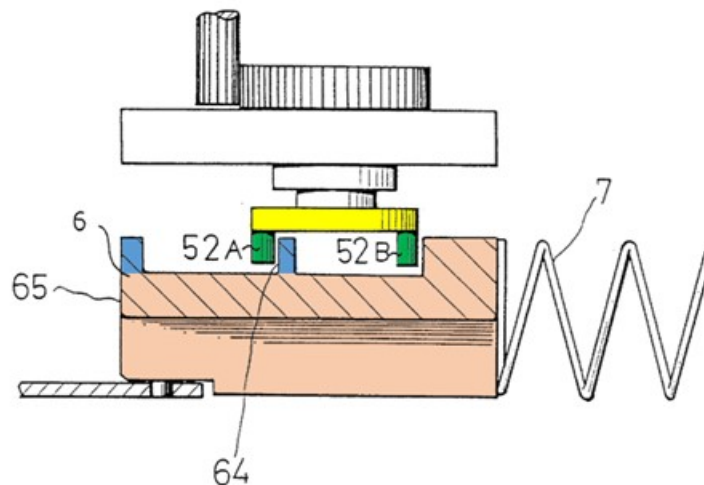


Fig. 3.

Here, the lifter is rotated (curved arrows) such that its extensions (green) engage the protrusions on the driver (blue) to cause the driver (orange) to move in a linear direction (straight arrow) within the driver track of the guide body. Lai, Figs. 4A-D, 1:62-63, 2:14-25; Vallee, ¶132.

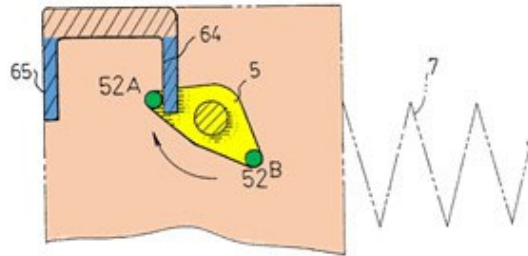


Fig. 4A.

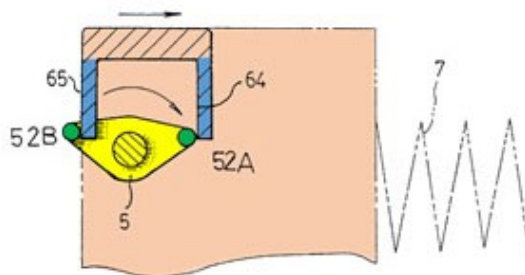


Fig. 4B.

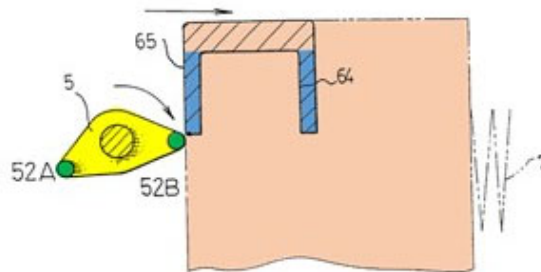


Fig. 4C.

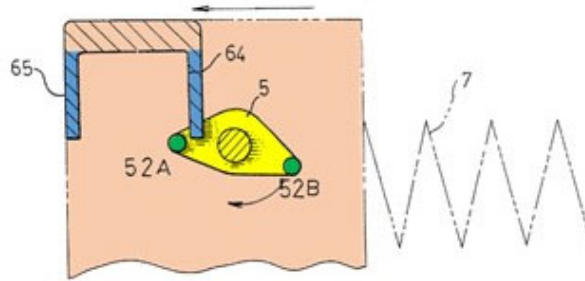
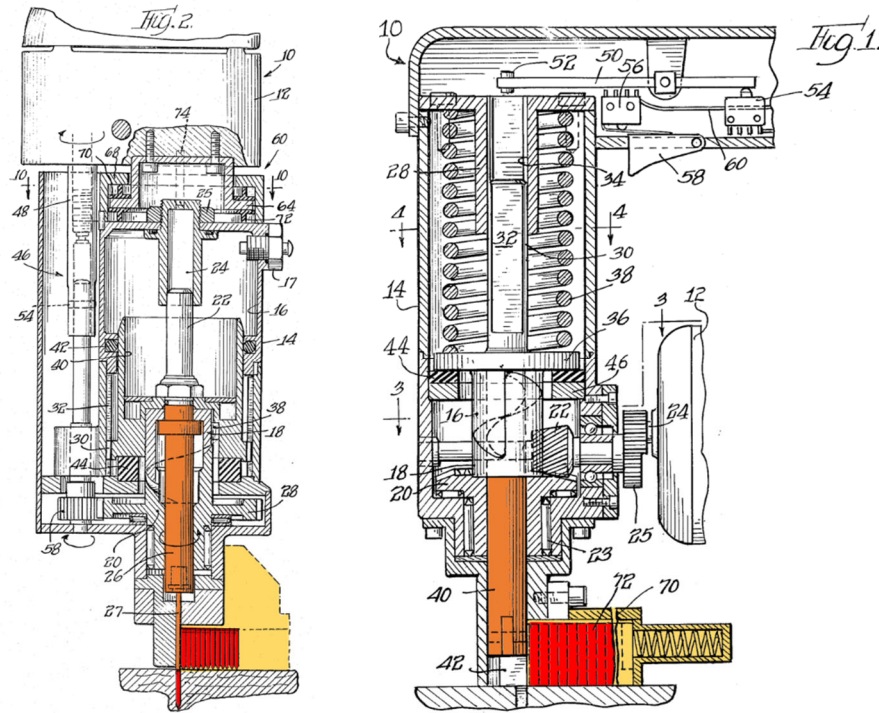


Fig. 4D.

5. *Claim 5*

Saari/Enstrom disclose “further comprising: a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.”

Saari/Enstrom’s magazine (70, light orange) contains a plurality of fasteners (“fastener member 72,” red), and provides them at a receiving position of the driver track of the guide body so that they are pushed by the movable drive (orange) toward an exit portion and into the workpiece. Saari, Fig. 1, 2:61-63; Enstrom, Fig. 2; Vallee, ¶133.



6. Claim 6

Saari/Enstrom discloses “wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driver.” Saari/Enstrom’s hollow cylinder is the sole pressurized cylinder of the “fastener driving mechanism.” Saari, Fig. 10; Enstrom, Fig. 2.

7. Claim 7

In the event that claim 7’s contradiction with claim 1 is held to be a correctable error rather than rendering claim 7 indefinite, *see* §I.A.7, then this element is disclosed by Saari/Enstrom as explained above in relation to Elements 1.5-1.6.

8. Claim 8

Elements [8.P]-[8.4], [8.6] and [8.9]

Elements 8.P-8.2, 8.4, 8.6 and 8.9 are identical to Elements 1.P-1.2 and 1.4-1.6, respectively, and are met as described above. Element 8.3 is substantially identical to Element 1.3 and met as described above,

Element [8.5]

The combination discloses “an on-board electrical energy source, with no external energy source attached to said fastener driving tool.” In that combination, Lai’s lifter is provided with motive power by a motor (“motor 3”). Lai, 2:14-16. Lai’s motor is powered by an on-board electrical power source (Lai’s battery 2) and there is therefore no external energy source attached to the tool. Lai, Figs. 1-2, 1:25-35, 1:44-54, 1:60-62, 2:2; Vallee, ¶138.

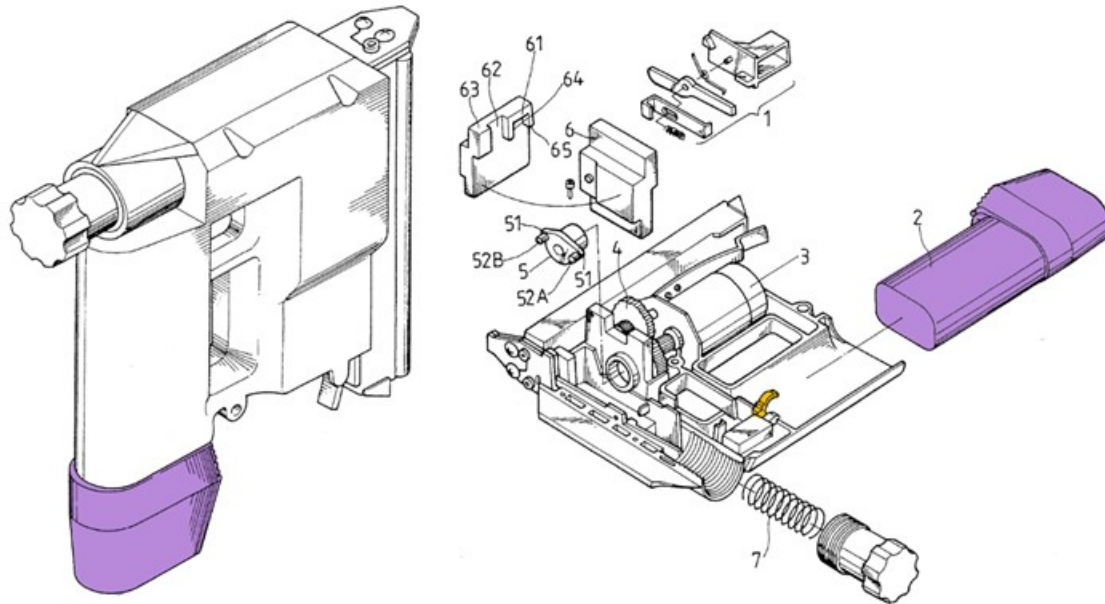


Fig. 1.

F I G. 2

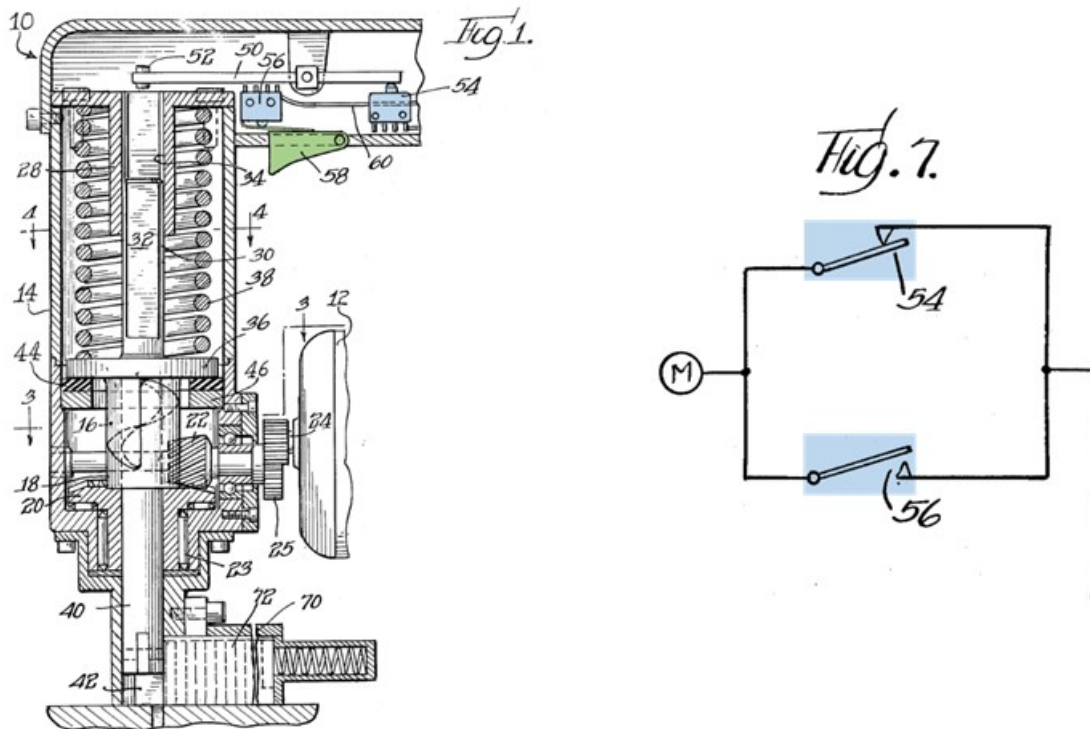
This combination is spurred on by the need for a portable, battery-powered nailer, and Lai both teaches and encourages its energy-efficient and compact lifting mechanism powered by its portable battery pack. *See* Element 1.5. Accordingly, in this combination, Saari/Enstrom’s electrical cable is replaced with Lai’s portable battery (Lai’s battery 2), and there would be no external energy source. Vallee, ¶139.

Element [8.7]

The combination discloses “a prime mover that is powered by said on-board electrical energy source, said prime mover causing said lifter to move, under first predetermined conditions.” In that combination, Lai’s lifter is moved by a prime mover (“motor 3”), which is powered by the on-board electrical energy source (Lai’s

battery 2). Lai, Figs. 1-2, 1:25-35, 1:44-54, 1:60-62, 2:2, 2:14-16; Vallee, ¶¶140-143.

In that combination, Saari/Enstrom's circuit would control the connection between Lai's prime mover ("motor 3") and its on-board electrical energy source (Lai's battery 2) according to input signals from switches 54 and 56 (below in light blue). Saari, 3:19-63, Fig. 1, 7-9.

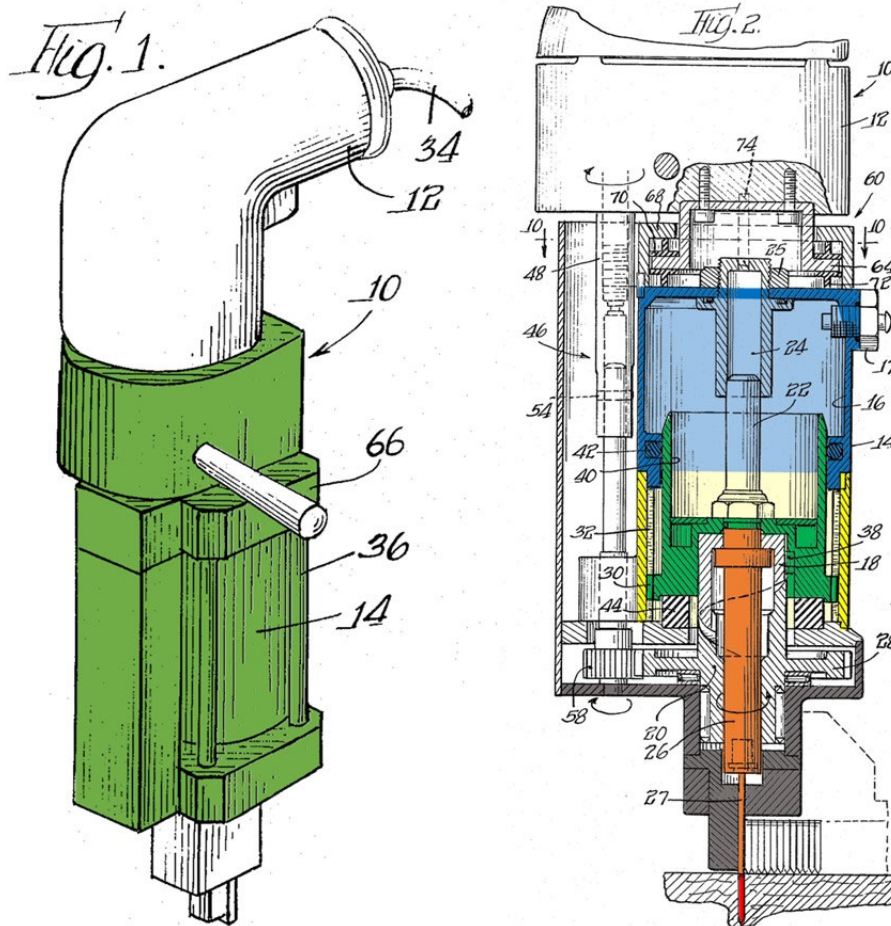


Saari/Enstrom's circuit is closed, and thus supplying power from the battery to the motor and causing the lifter to move, under the "first predetermined conditions," where the driving ram 40 is not yet raised to its cocked position and switch 54 is therefore still closed. Saari, 3:19-46, Fig. 7.

Element [8.8]

The combination discloses “a housing that holds said hollow cylinder, guide body, movable driver, storage chamber, on-board electrical energy source, lifter, and prime mover as a single, portable hand-operable tool.”

Saari/Enstrom’s housing (“housing 40”) is shown below in green. Saari, Fig. 1; Enstrom, Fig. 1 (below left). Saari/Enstrom’s housing holds, as a single, portable hand-operable tool, its hollow cylinder (yellow), guide body (grey), movable driver (orange), and storage chamber (blue). Enstrom, Fig. 1 (below right). In the combination with Lai, Saari/Enstrom’s housing will also include Lai’s on-board electrical energy source (battery 2), lifter (“cam 5”), and prime mover (“motor 3”).



9. Claim 9

The combination discloses “wherein said on-board electrical energy source comprises a battery.” In that combination, Lai’s on-board electrical energy source is a detachable battery as reflected by Fig. 1 showing battery 2 (purple) attached and Fig. 2 showing battery 2 detached and showing an internal attachment clip (orange). Lai, Figs. 1-2; Vallee, ¶145.

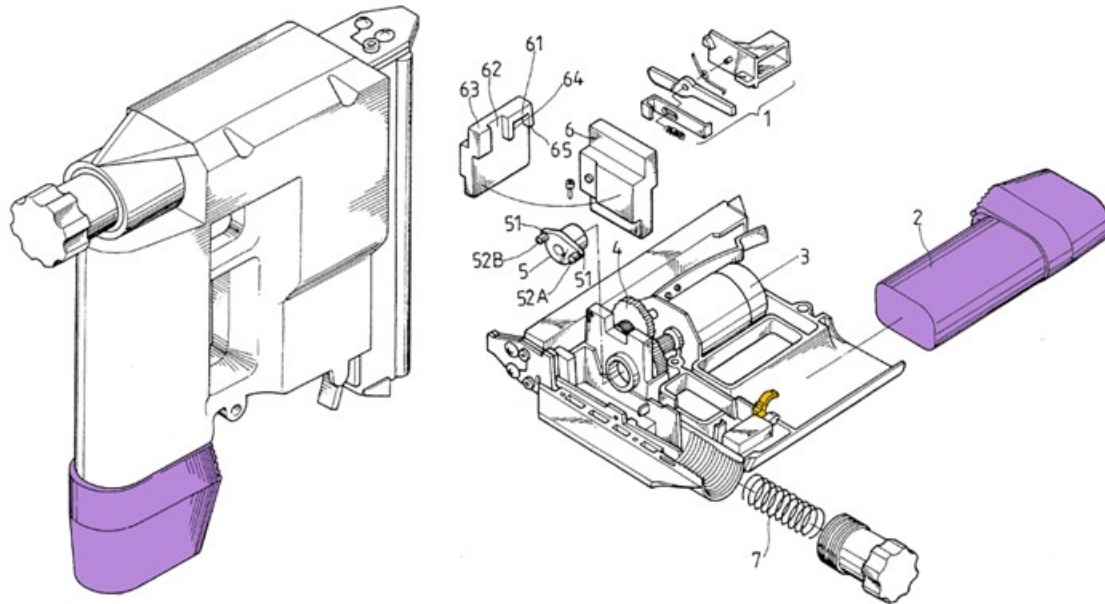


Fig. 1.

F I G. 2

10. Claim 10

The combination discloses “wherein said prime mover comprises an electric motor.” Lai’s prime mover (“motor 3”) is powered by an electrical power source (battery 2) and thus is an electric motor. Lai, 1:25-35, 1:44-54, 1:60-62, 2:2; Vallee, ¶146.

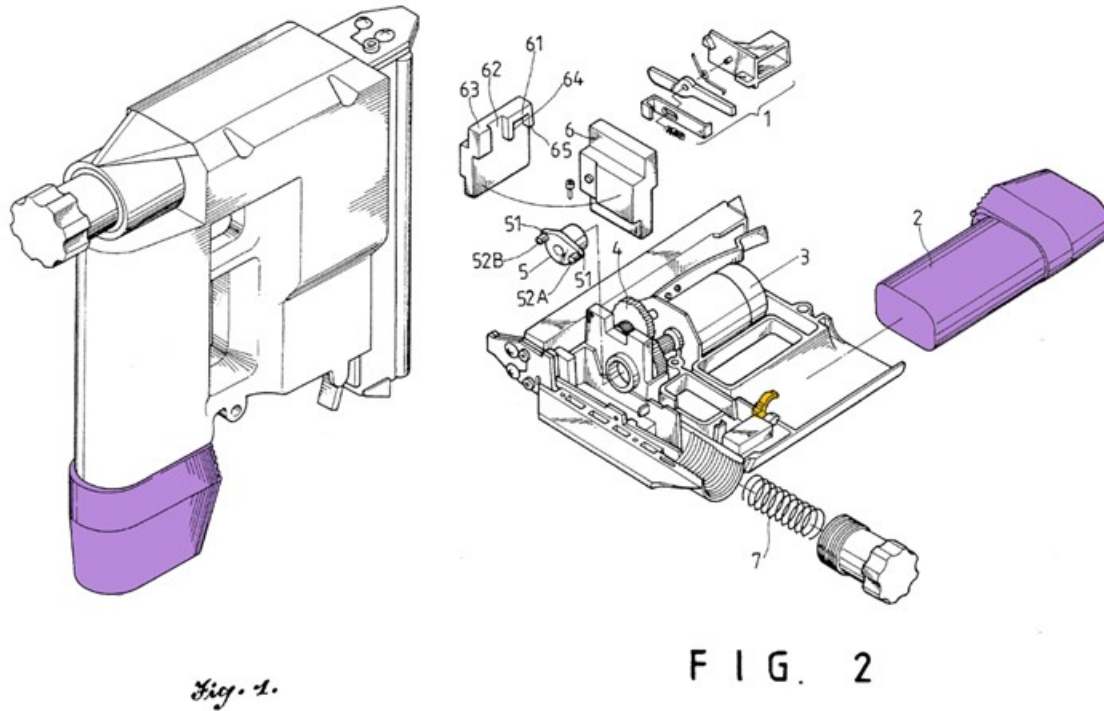
11. Claim 11

Claim 11 is identical to Claim 7 and is met as described above.

12. Claim 12

The combination discloses “wherein said prime mover is powered by an electrical power supply that is carried on said tool.” In that combination, Lai’s on-board electrical energy source that powers the prime mover is an electrical battery carried on the tool as reflected by Fig. 1 showing battery 2 (purple) attached and Fig.

2 showing battery 2 detached and showing an internal attachment clip (orange). Lai, Figs. 1-2 (below); Vallee, ¶148.



13. Claims 13-17

Claims 13-17 are identical to Claims 2-6, respectively, and are met as described above.

14. Claim 18

Elements [18.P]-[18.4] and [18.6]

Elements 18.P-18.4 and 18.6 are identical to Elements 1.P-1.4 and 1.6, respectively, and are met as described above.

Element [18.5]

Element 18.5 is met as described above for Element 1.5.

As discussed above in relation to claim 3, in the combination, the lifter taught by Lai includes a rotating disk (“cam 5,” yellow) that moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Lai, Figs. 4A-D, 1:62-63, 2:14-25.

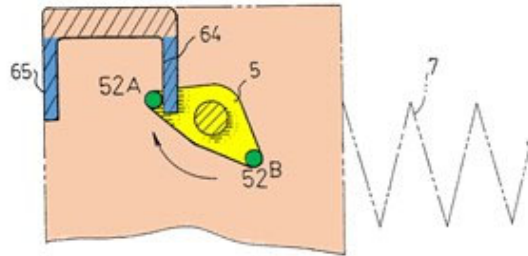


Fig. 4A.

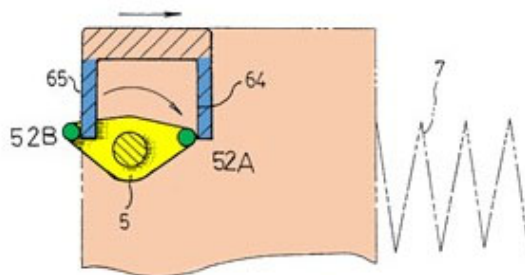


Fig. 4B.

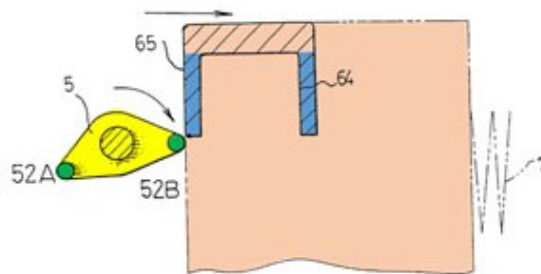
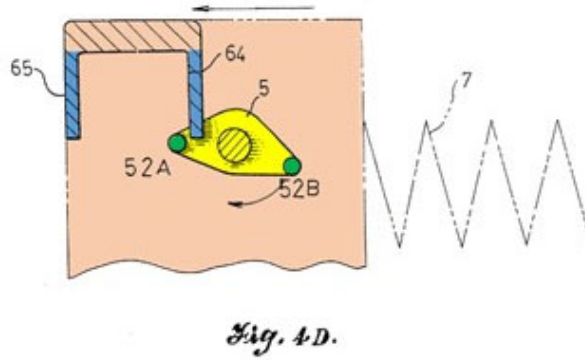


Fig. 4C.



15. *Claims 19-20*

Claim 19 is identical to Claim 2 and is met as described above. Claim 20 is substantially identical to Claim 3 and is met as described above.

C. **Ground 3: Claims 1-20 are Obvious based on Kondo**

1. *Claim 1*

Element [1.P]

U.S. Patent No. 5,720,423 (“Kondo”) discloses “[a] fastener driver adapted for use in a fastener driving tool.” Kondo “provide[s] a fastener driving tool which is operable to drive fasteners,” Kondo, 1:48-49.

Element [1.1]

Kondo discloses “a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston.” Kondo refers to its hollow cylinder (yellow) as “cylindrical main body 11a,” refers to the movable piston (green) within that hollow cylinder as “drive piston 12,” and says that the piston is “disposed within the main body 11a of the

cylinder 11,” and “is moved vertically within the main body 11a of the cylinder 11.”

Kondo, 4:45-46, 5:9-11, Figs. 1-2.

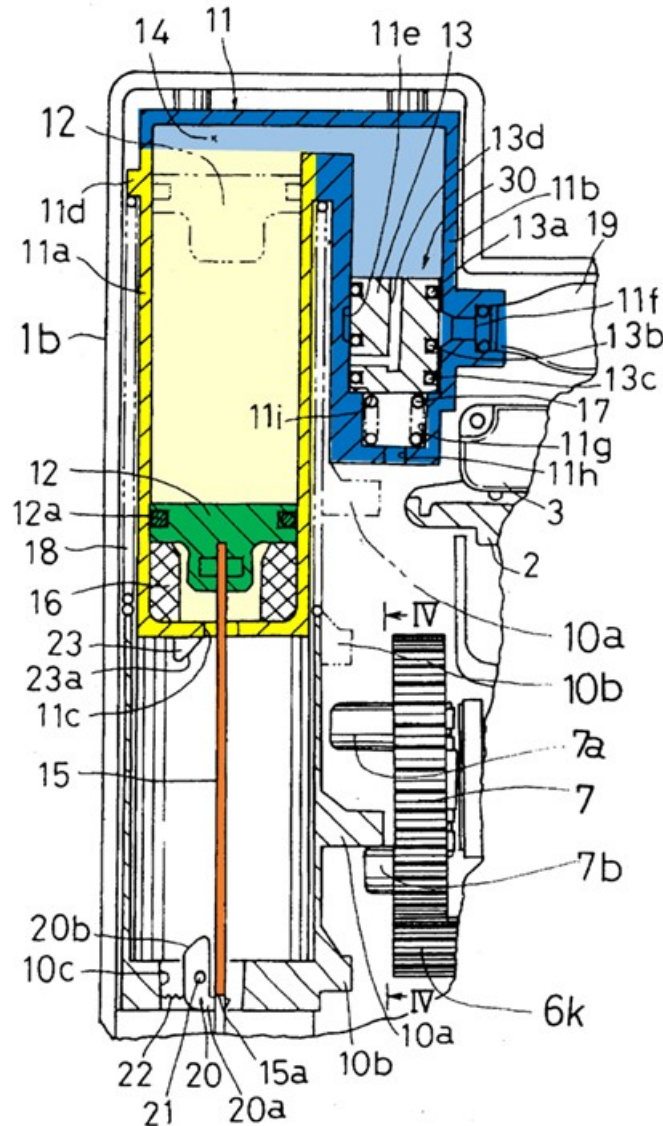


FIG. 2

The hollow cylinder has a displacement volume created by the stroke of the drive piston, which is indicated by the dashed-line illustration of the drive piston 12 at its raised position shown in Figures 1 and 2. Kondo, Figs. 1-2.

Element [1.2]

Kondo discloses “a guide body that is sized and shaped to receive a fastener that is to be driven.” Kondo discloses a guide body (“driver guide 8,” grey) with a linear passageway (“guide hole 8a”) for the driver (“driver 15,” orange) and that is sized and shaped to receive a fastener (nails from “nail magazine 9”). Kondo, 5:7-11, 5:15-23; Figs. 1-2.

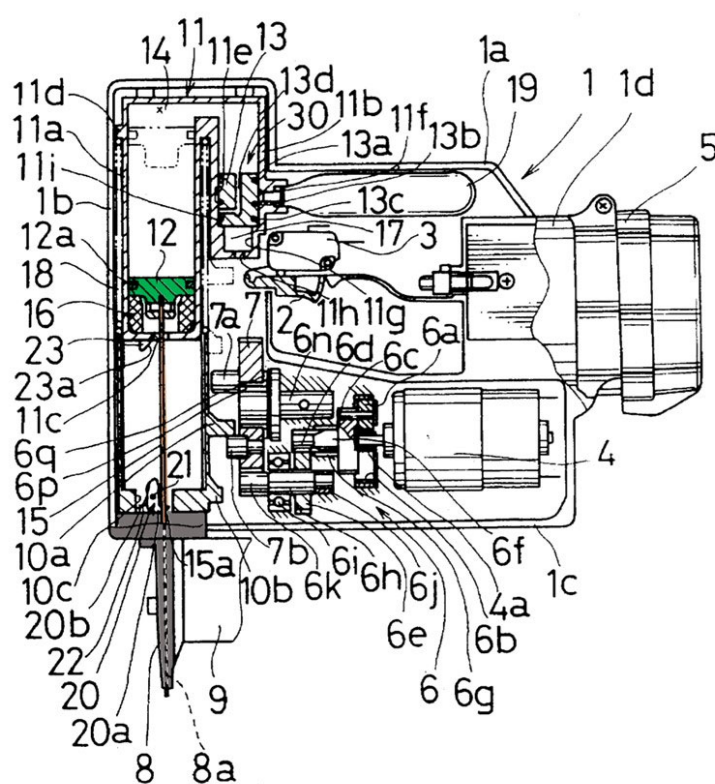


FIG.1

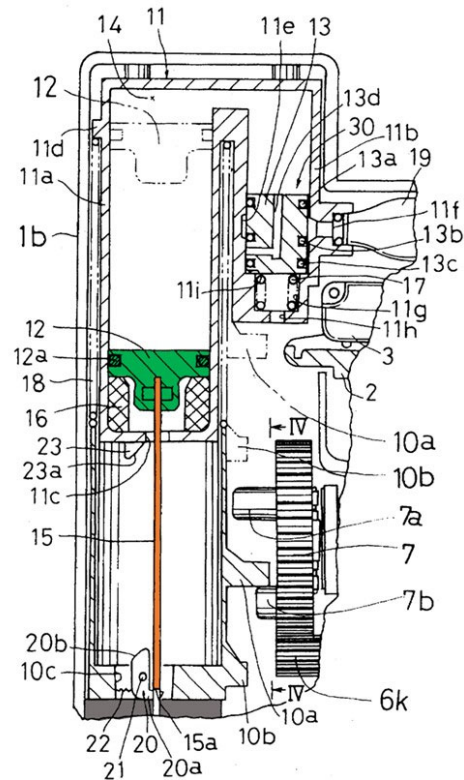


FIG.2

Element [1.3]

Kondo discloses “a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide

body.” Kondo’s movable driver (“driver 15,” orange) is in communication with its piston (“piston 12,” green) and is sized and shaped to push a fastener from the guide body. Kondo, 4:66-67, 5:19-23, Figs. 1-2.

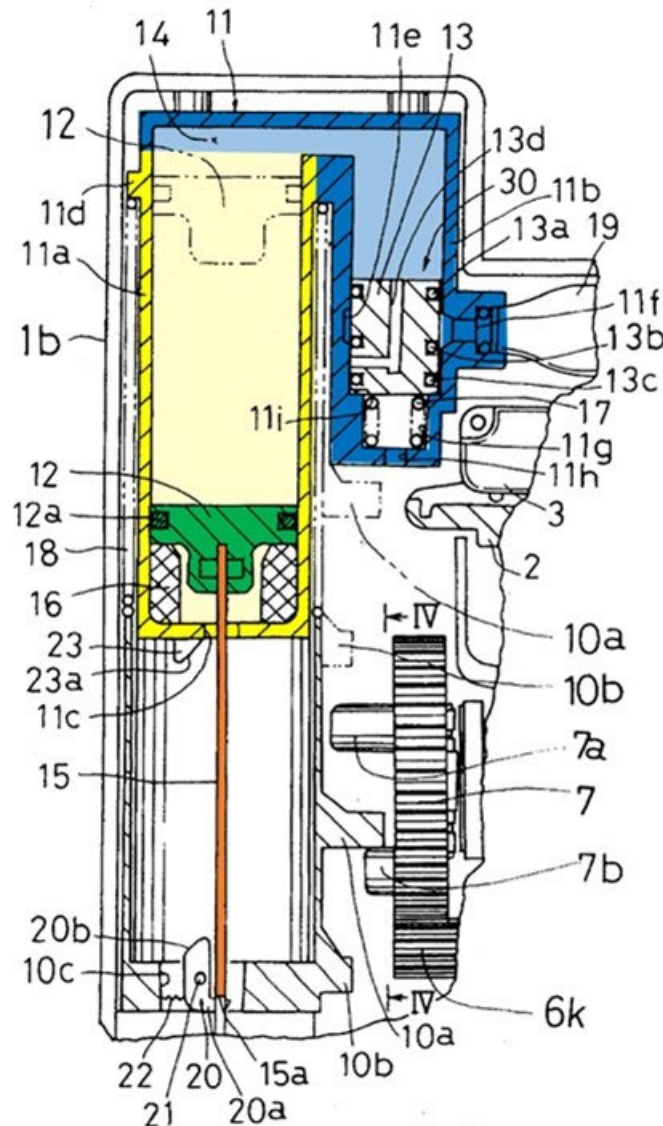


FIG. 2

Element [1.4]

Kondo discloses “a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder.” Kondo’s storage chamber is the “air chamber 14” of its “auxiliary cylinder portion 11b” (blue), which is in fluidic communication at all times with said displacement volume of the cylinder (“cylindrical main body 11a”). Kondo, 4:37-40, Figs. 1-2.

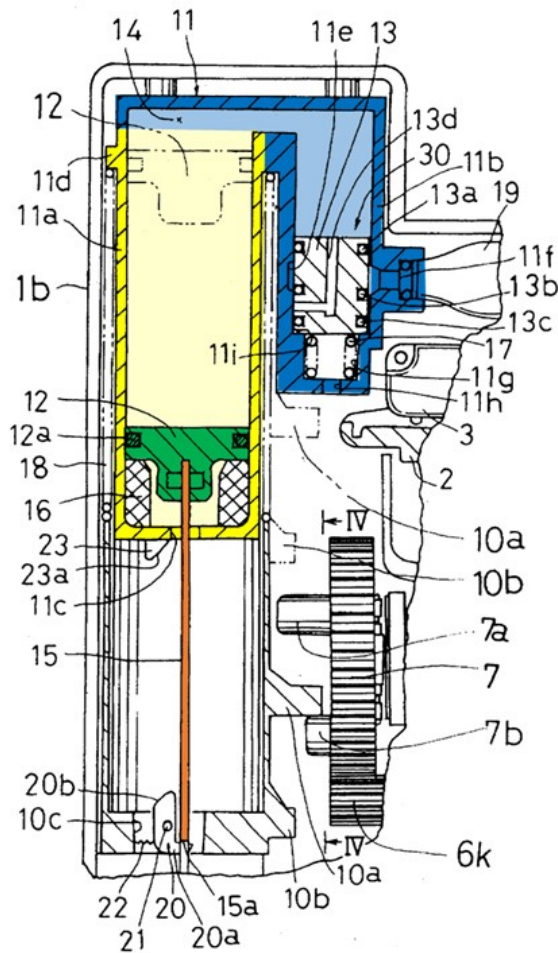


FIG.2

Kondo's storage chamber ("air chamber 14" of "auxiliary cylinder portion 11b") is distinct from the cylinder ("cylindrical main body 11a"). Kondo generally refers to a "cylinder 11," but also distinctly references "cylindrical main body 11a" and "auxiliary cylinder portion 11b" of cylinder 11. Kondo, 4:35-40. A POSITA would consider Kondo's cylinder (the "cylindrical main body 11a," yellow) to be distinct from the portion of the "air chamber 14" above and beside it, because that portion of the chamber is surrounded by a structure with a different arrangement, radius, and alignment than the "cylindrical main body 11a." Vallee, ¶160; Kondo, Figs 1-2.

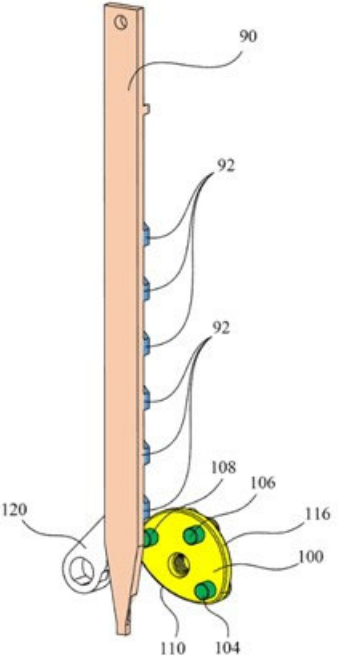
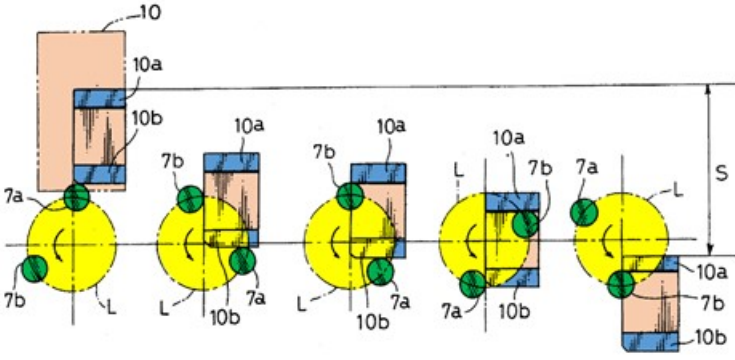
Kondo's main storage chamber is "initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle." The design of the "auxiliary piston 13" shows that Kondo's main storage chamber is both initially charged and remains above atmospheric pressure during all portions of the operating cycle. Vallee, ¶161. Because the "compression coil spring 17" and atmospheric pressure (through "communication hole 11h) are collectively acting upon the bottom of "auxiliary piston 13" (Kondo, 6:31-39) and because Kondo's "air replenishing tank 19" is meant to be used only after "the use of the nailer for a long time" (Kondo, 7:63-67), Kondo's pressure must remain, during all portions of the operating cycle, above the combined pressures of atmospheric pressure plus the

pressure of “compression coil spring 17,” which by definition will be higher than atmospheric pressure alone. Vallee, ¶161. While Kondo discloses a gas replenishment system, that system is only meant to be used after “the use of the nailer for a long time” (Kondo, 7:63-67), *i.e.*, after the pressurized gas is re-used for a plurality of operating cycles. Vallee, ¶161.

Element [1.5]

Kondo discloses “a lifter that, under first predetermined conditions, moves said movable driver toward a ready position.” Kondo discloses an electrically-powered, mechanical lifting mechanism with a structure that is nearly identical (with only insignificant differences) to that of the “lifter member” disclosed by the ’954 patent. *Compare* ’954 patent, Fig. 12 with Kondo, Figs. 1-4. The “lifter member” of the ’954 patent includes a rotatable cam lifter 100 (yellow, below left), with pin 104, 106, and 108 (green) on its face surface that engage protrusions 92 (blue) on the driver member 90 (orange). ’954 patent, 9:25-41, 16:32-46, Fig. 12. The ’954 patent also discloses two-pin variants: lifter members 465 and 480 in Figs. 31 and 33. ’954 patent, 32:12-27, 32:45-60. Kondo discloses a rotatable drive gear 7 (yellow, below right), with crank pins 7a and 7b (green) on its face surface that engage two protrusions 10a and 10b (blue) on an intermediate member 10 (orange) that contains the driver member (“driver 15”). Kondo, 3:1-4:32, Figs. 1-4.³

³ Figs. 4A-E are illustrated from right-to-left, rather than left-to-right.

'954 Patent Lifter Member	Kondo Lifter Member
 Fig. 12	 FIG. 4(E) FIG. 4(D) FIG. 4(C) FIG. 4(B) FIG. 4(A)

Kondo differs slightly from the '954 patent in that the pins of the lifter member (crank pins 7a and 7b) engage protrusions on an intermediate member (protrusions 10a and 10b on an intermediate member 10) rather than protrusions on the driver blade itself. However, a POSITA would consider this difference to be insignificant, because Kondo's actual lifting structure is still the same as that of the "lifter member" in the '954 patent and the intermediate member simply channels the lifting force from that lifter member to the driver blade 15. Vallee, ¶163.

Kondo discloses an electrical circuit that by which "battery 5, the microswitch 3 and the motor 4 are connected to each other." Kondo, 2:65-67. The microswitch

3 is turned on by operation of the trigger 2. Kondo, 2:57-61. Accordingly, “[w]hen the operator pulls the trigger 2 to start the motor 4, the actuation device 6 is actuated, so that the intermediate member 10 is moved upwardly as the drive gear 7 is rotated” and “[t]he driver 15 is moved upwardly together with the intermediate member 10 by means of the engaging member 20, so that the drive piston 12 moves upwardly within the main body 11a of the cylinder 11.” Kondo, 6:63-7:2. Thus, under first predetermined conditions—that is, with the trigger actuated and the driver not yet raised to its upper dead center position—Kondo’s circuit will provide power to the lifter to move the movable driver toward the ready position. Vallee, ¶164.

Element [1.6]

Kondo discloses “wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.”

Kondo discloses that, “[w]hen the crankpin 7a of the drive gear 7 reaches its upper dead center (State (E) in F.G. 4), the intermediate member 10 as well as the drive piston 12 reaches its uppermost position (indicated by chain lines in FIG. 2), so that the air within the air chamber 14 is compressed to a predetermined pressure.” Kondo, 7:6-11. As that point, “the engaging member 20 is pivoted against the biasing force of the spring 22 to disengage its claws 2a from the driver 15” and “the

drive piston 12 is moved downwardly by the pressure of the compressed air within the air chamber 14, so that the driver 15 is moved downwardly to drive the nail supplied to the driver guide 8 so as to eject the nail from the lower end of the driver guide 8.” Kondo, 7:14-25. Thus, under second predetermined conditions—that is, when the driver and driver gear are in “State (E)” and the air chamber reaches the “predetermined pressure”—the pressurized gas of the storage chamber (“air chamber 14”) and the cylinder (“cylinder 11”) will act on the piston (“drive piston 12”) to form a gas spring to move the movable driver toward a driven position and thus drive a nail during a drive stroke. Kondo, Figs. 1, 2, 4A-4E; 5:53-55, 6:1-7. When the driver 15 is released, “the drive piston 12 is forced downwardly by the expanding force of the air compressed within the air chamber 14.” Kondo, 6:1-7.

The pressurized gas of both the storage chamber (“air chamber 14” of “auxiliary cylinder portion 11b”) and the displacement volume (in “cylindrical main body 11a”) act on the piston (“drive piston 12”). Kondo, 4:58-62, 7, 20-26, Figs. 1-2; Vallee, ¶166.

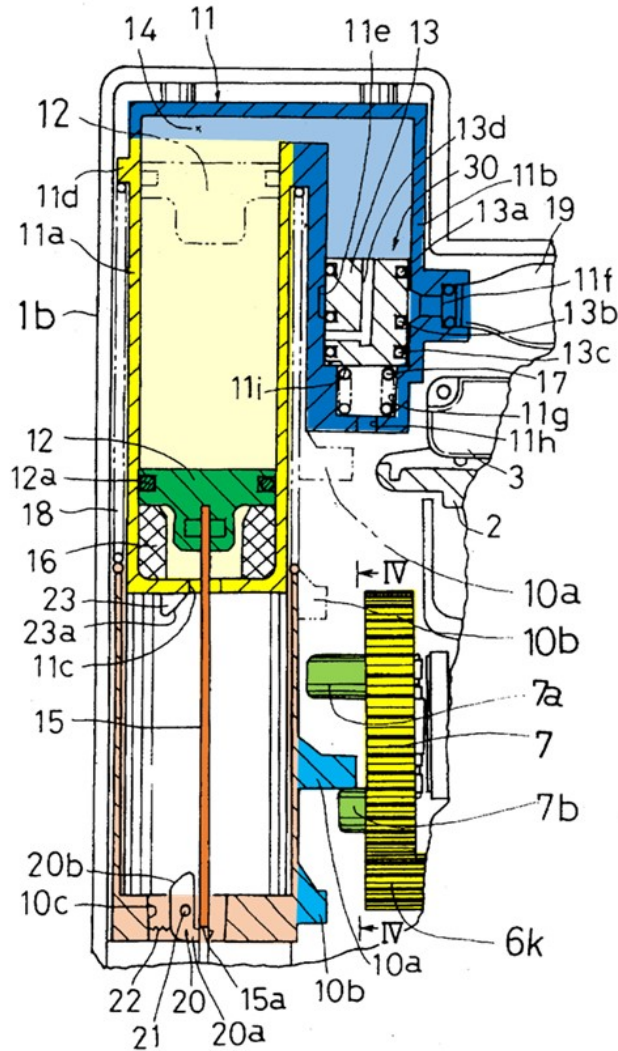


FIG. 2

Kondo's movable driver 15 is lifted via spaced-apart protrusions 10a and 10b (light blue) on intermediate member 10 (light orange), Kondo, 3:39-52, Figs. 2, 4A-4E, and thus does not literally disclose "having a plurality of protrusions that are located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another." However, it was obvious to a POSITA to modify Kondo to have protrusions 10a and 10b be located along a longitudinal edge of the

driver 15. Vallee, ¶168. In fact, Kondo itself discloses, in its third embodiment, a driver (“driver 52”) with a protrusion (“stepped portion 52a”) that is directly engaged by the lifter. *Id.*; Kondo, 8:62-67, Fig. 8. According to Dr Vallee, it was a simple design choice as to whether or not to have the protrusions be on the driver itself (as in Kondo’s third embodiment) or on an intermediate member (as in Kondo’s first embodiment), and that a POSITA was motivated to have the protrusions be located along a longitudinal edge of the driver for a less complex design when possible, *i.e.*, for nailers designed to drive higher gauge nails and thus requiring a thicker driver that would be strong enough to have protrusions. Vallee, ¶169.

3. *Claim 3*

Kondo discloses “wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said movable driver and forces said movable driver to move toward its ready position, using a rotary-to-linear motion.” Kondo’s lifter includes a disk (“drive gear,” yellow) with two extensions protruding from its surface (“crank pins 7a and 7b,” green), which moves the movable driver (via “intermediate member 10,” light orange) toward its ready position under first predetermined conditions (*see* Element [1.5]). Kondo, 3:1-4:32, Figs. 1-4; Vallee, ¶¶170-171.

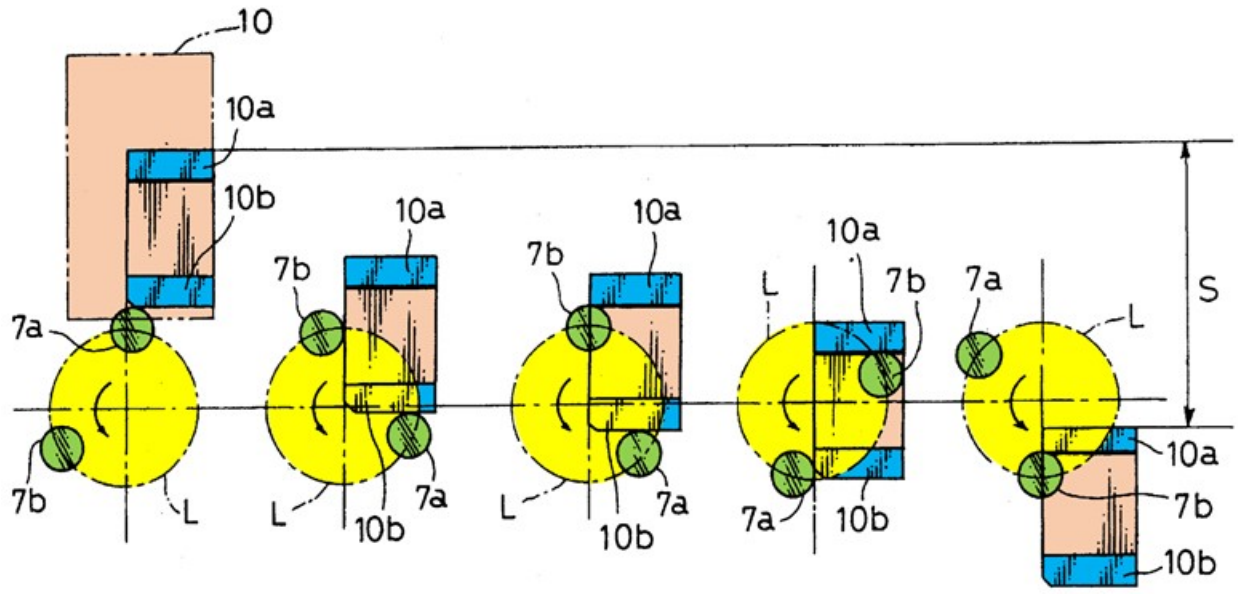


FIG. 4(E) FIG. 4(D) FIG. 4(C) FIG. 4(B) FIG. 4(A)

The lifter taught by Kondo moves in rotational motion (curved arrows) to cause the driver (via intermediate member 10, light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Kondo, Figs. 4A-E, 3:57-67.

4. *Claim 4*

Element [4.1]

Element 4.1 is identical to Element 2 and is met as described above.

Element [4.2]

The obvious modification of Kondo discussed above in relation to claim 2 where the protrusions 10a and 10b are located on the driver 15, discloses “such that said at least one extension of said lifter fits in a space between said spaced-apart

plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby causing said movable driver to move in a substantially linear direction within a driver track of said guide body.”

Kondo’s lifter includes extensions protruding from its surface (“crank pins 7a and 7b,” light green), that fit between the spaced-apart protrusions (“protrusions 10a and 10b,” light blue). Kondo, Figs. 2, 4A-E, 3:41-57; Vallee, ¶173.

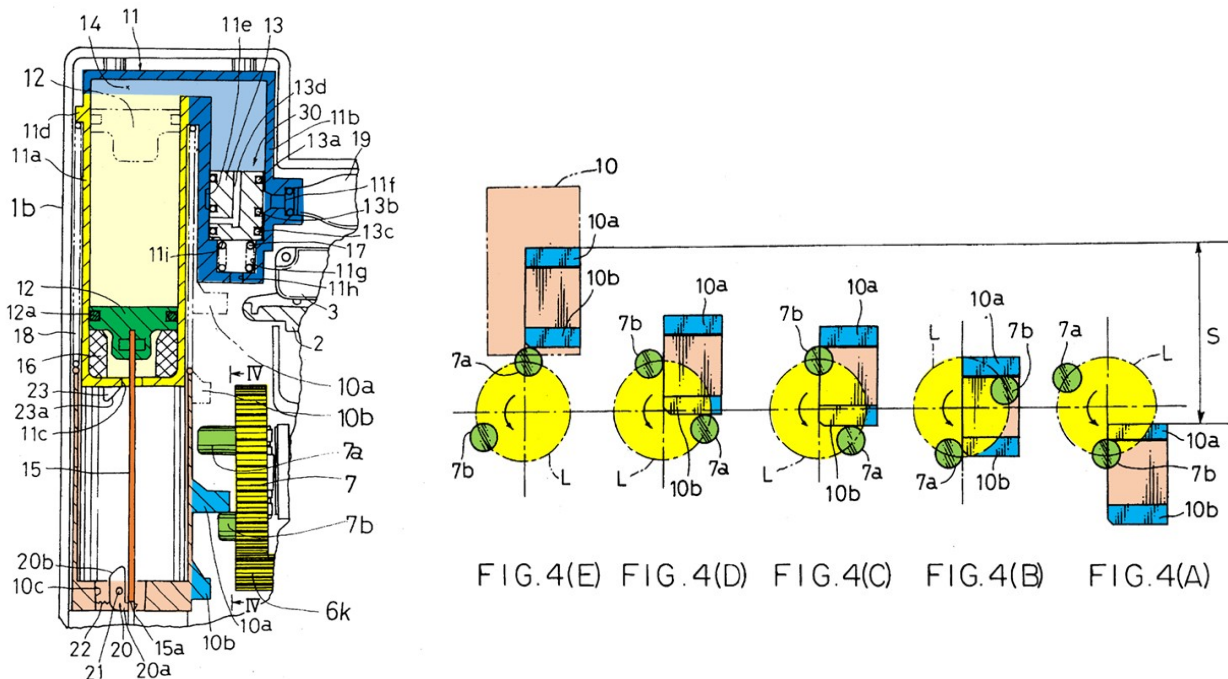


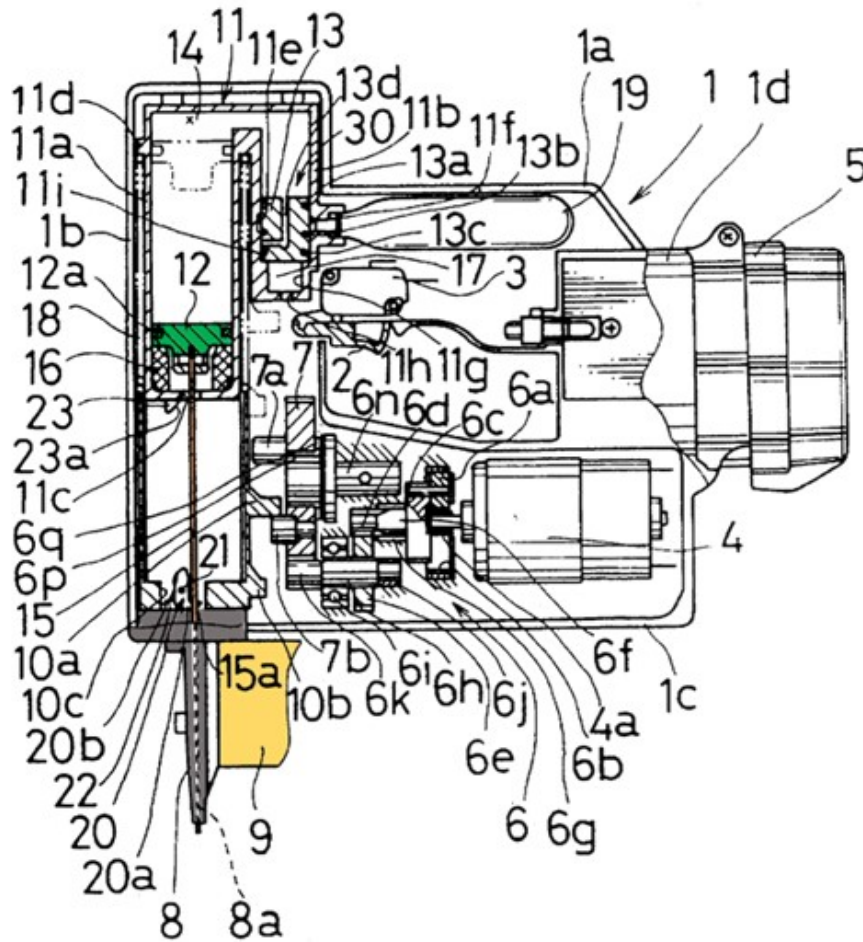
FIG.2

Kondo’s lifter is rotated (curved arrows in Figs. 4A-E) such that its extensions (light green) engage the protrusions on the driver (light blue) to cause the driver (orange) to move in a linear direction (straight arrow) within the driver track of the guide body. Kondo, Figs. 2, 4A-E, 3:41-57; Vallee, ¶174.

5. *Claim 5*

Kondo discloses “further comprising: a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.”

Kondo’s magazine (“nail magazine 9,” light orange) contains a plurality of fasteners (“a nail stick consisting of a series of nails bonded to each other”), and provides them at a receiving position of the driver track of the guide body (grey) so that they are pushed by the movable driver (orange) toward an exit portion and into the workpiece. Kondo, Fig. 1, 5:15-23.



6. Claim 6

Kondo discloses an “air replenishing tank 19” that is used to replenish gas by way of an “air replenishing piston 13 disposed within the auxiliary cylinder portion 11b,” Kondo, 4:50-51, and thus does not expressly meet the requirement of “wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driver.” However, it was obvious to omit Kondo’s gas replenishment system and therefore satisfy this claim limitation. Kondo’s own claims relegate the gas

replenishment system to dependent claims, clearly establishing that it is an optional feature. Kondo, claims 1-3. Kondo's gas replenishment system is an optional feature because it is not used during normal operation, but rather is intended to recharge the main storage chamber when the pressure level eventually degrades due to minor leaks of pressurized gas after "the use of the nailer for a long time." Vallee, ¶177; Kondo, 7:62-8:1. Kondo's gas replenishment system adds weight, cost, and complexity to the tool in exchange for an improvement in longevity, so the decision whether to include it would be a simple design choice with predictable results. Vallee, ¶178. A POSITA was motivated to not include Kondo's gas replenishment system due to market and design pressures favoring compact, lightweight, and less expensive tools. Vallee, ¶178; *see* Lai, 1:9-10 ("As we know, the ideal electric stapling gun should be energy saving, strong in hitting force and compact in size."). With Kondo's gas replenishment system not included, the "cylindrical main body 11a" would be the sole pressurized cylinder of the fastener driving mechanism. Vallee, ¶178; Accordingly, this claim limitation is rendered obvious by Kondo alone.

7. Claim 7

In the event that claim 7's contradiction with claim 1 is held to be a correctable error rather than rendering claim 7 indefinite, *see* §I.A.7, then this element is disclosed by Saari/Enstrom as explained above in relation to Elements 1.5-1.6.

8. Claim 8

Elements [8.P]-[8.4], [8.6] and [8.9]

Elements 8.P-8.2, 8.4, 8.6 and 8.9 are identical to Elements 1.P-1.2 and 1.4-1.6, respectively, and are met as described above. Element 8.3 is substantially identical to Element 1.3 and met as described above.

Element [8.5]

Kondo discloses “an on-board electrical energy source, with no external energy source attached to said fastener driving tool.” Kondo discloses an on-board electrical power source (“battery 5,” purple) as the “power source for driving the motor 4” such that “it is not necessary to be connected to an external power source by means of a cord.” Kondo, 7:51-55, Fig. 1. Kondo notes that “[t]his means that the nailer of this embodiment is hoseless and cordless.” Kondo, 7:54-55.

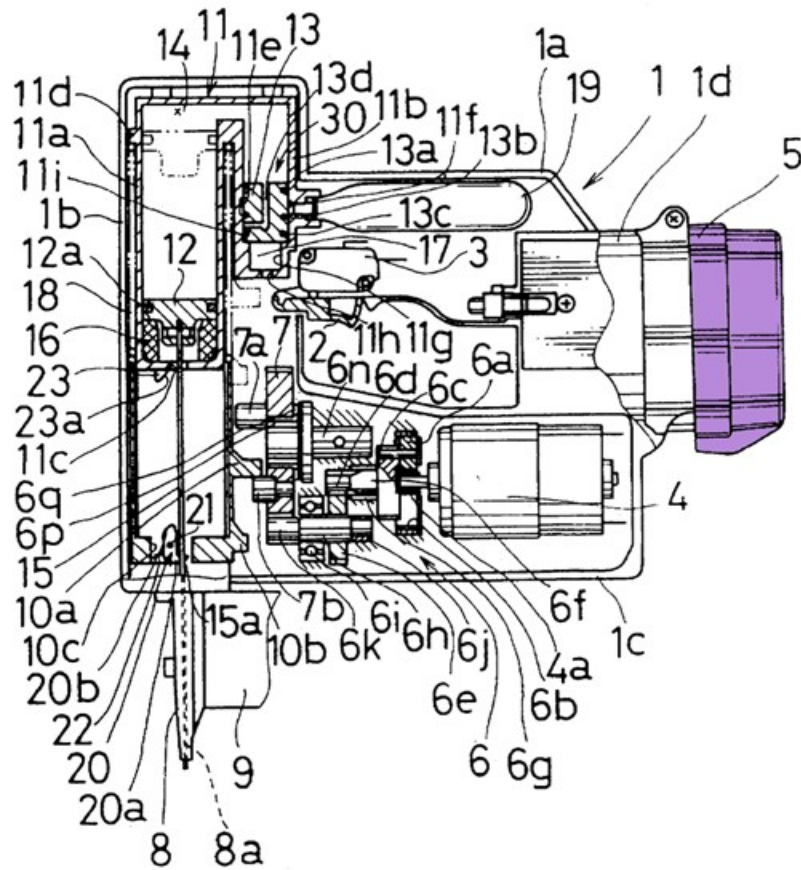


FIG.1

Element [8.7]

Kondo discloses “a prime mover that is powered by said on-board electrical energy source, said prime mover causing said lifter to move, under first predetermined conditions.” Kondo’s prime mover (“motor 4”) causes its lifter (“drive gear 7”) to move, under the first predetermined conditions discussed above. Kondo, Fig. 1-2, 4A-E, 3:39-4:32, 4:66-5:14. Kondo’s prime mover (“motor 4”) is powered by the on-board electrical energy source (“battery 5”). Kondo, 7:51-55, Fig. 1; Vallee, ¶183.

Element [8.8]

Kondo discloses “a housing that holds said hollow cylinder, guide body, movable driver, storage chamber, on-board electrical energy source, lifter, and prime mover as a single, portable hand-operable tool.” Kondo’s housing (“housing 1”) is shown below in dark green. Kondo, 2:50-53, Fig. 1. Kondo’s housing holds, as a single, portable hand-operable tool, its hollow cylinder (“cylindrical main body 11a,” yellow), guide body (“driver guide 8,” grey), movable driver (“driver 15,” orange), storage chamber (“air chamber 14,” light blue), on-board electrical energy source (“battery 5,” purple), lifter (“drive gear 7,” dark yellow), and prime mover (“motor 4,” dark red).

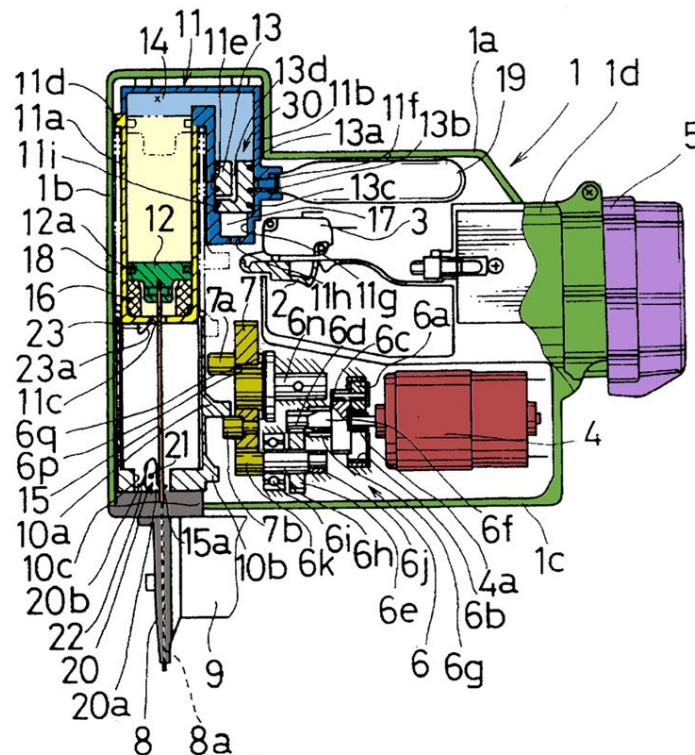


FIG.1

9. Claim 9

Kondo discloses “wherein said on-board electrical energy source comprises a battery.” Kondo’s on-board electrical power source is a battery (“battery 5,” purple). Kondo, 2:61-63, 7:51-55, Fig. 1.

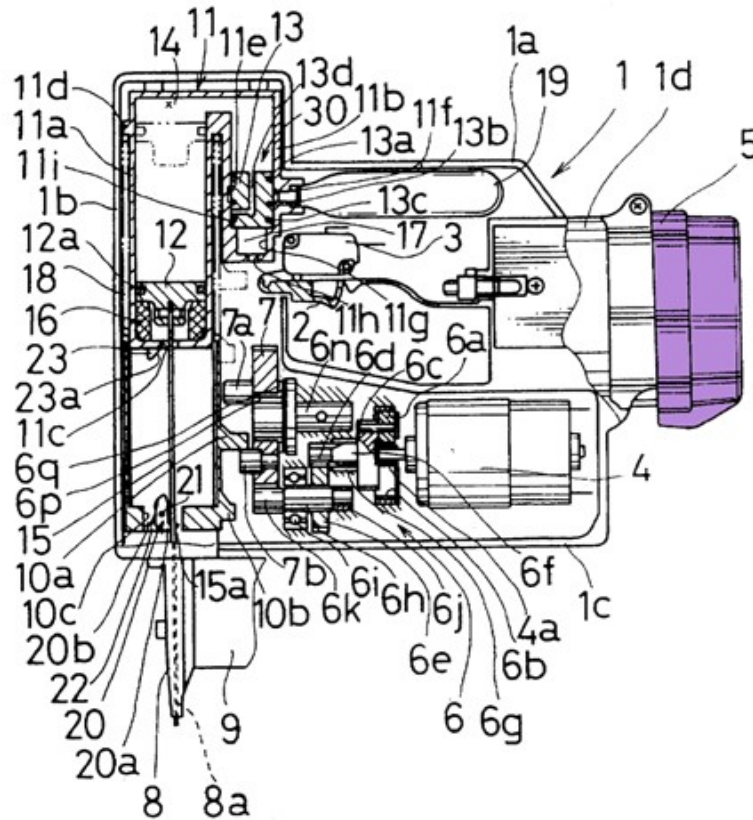


FIG.1

10. Claim 10

Kondo discloses “wherein said prime mover comprises an electric motor.” Kondo’s motor (“motor 4”) is powered by its electric battery and therefore is an electric motor. Kondo, 7:51-55, Fig. 1; Vallee, ¶186.

11. Claim 11

Claim 11 is identical to Claim 7 and is met as described above.

12. Claim 12

Kondo discloses “wherein said prime mover is powered by an electrical power supply that is carried on said tool.” Kondo discloses an electrical power supply carried on the tool (“battery 5,” purple below) that is the “power source for driving the motor 4” such that “it is not necessary to be connected to an external power source by means of a cord.” Kondo, 7:51-55, Fig. 1. Kondo notes that “[t]his means that the nailer of this embodiment is hoseless and cordless.” Kondo, 7:54-55.

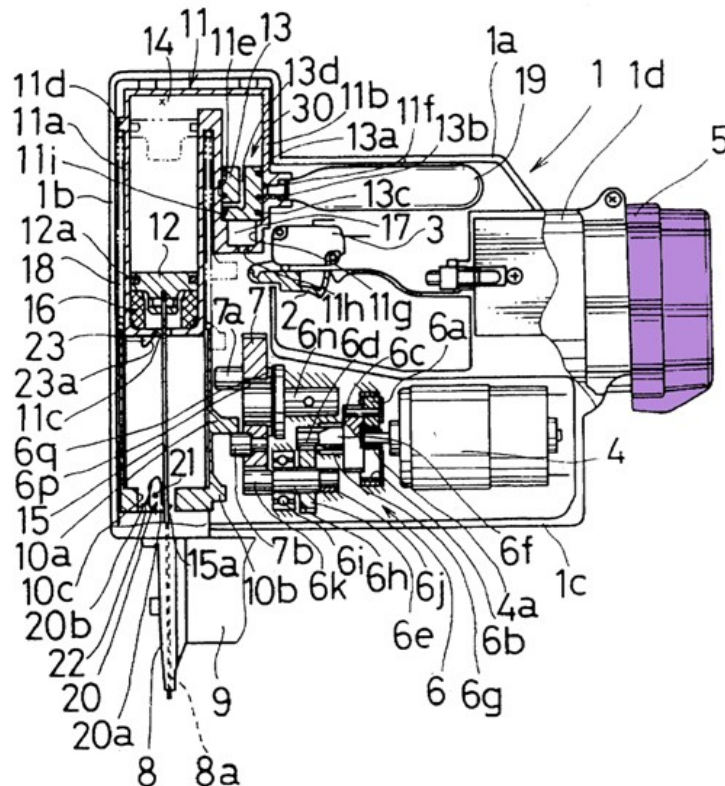


FIG.1

13. Claims 13-17

Claims 13-17 are identical to Claims 2-6, respectively, and are met as described above.

14. Claim 18

Elements [18.P]-[18.4] and [18.6]

Elements 18.P-18.4 and 18.6 are identical to Elements 1.P-1.4 and 1.6, respectively, and are met as described above.

Element [18.5]

Element 18.5 is met as described above for Element 1.5.

As discussed above in relation to claim 3, Kondo's lifter includes a rotating disk ("drive gear 7," yellow) that moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow), thus using rotary-to-linear motion. Kondo, Figs. 4A-E, 3:41-57; Vallee, ¶192.

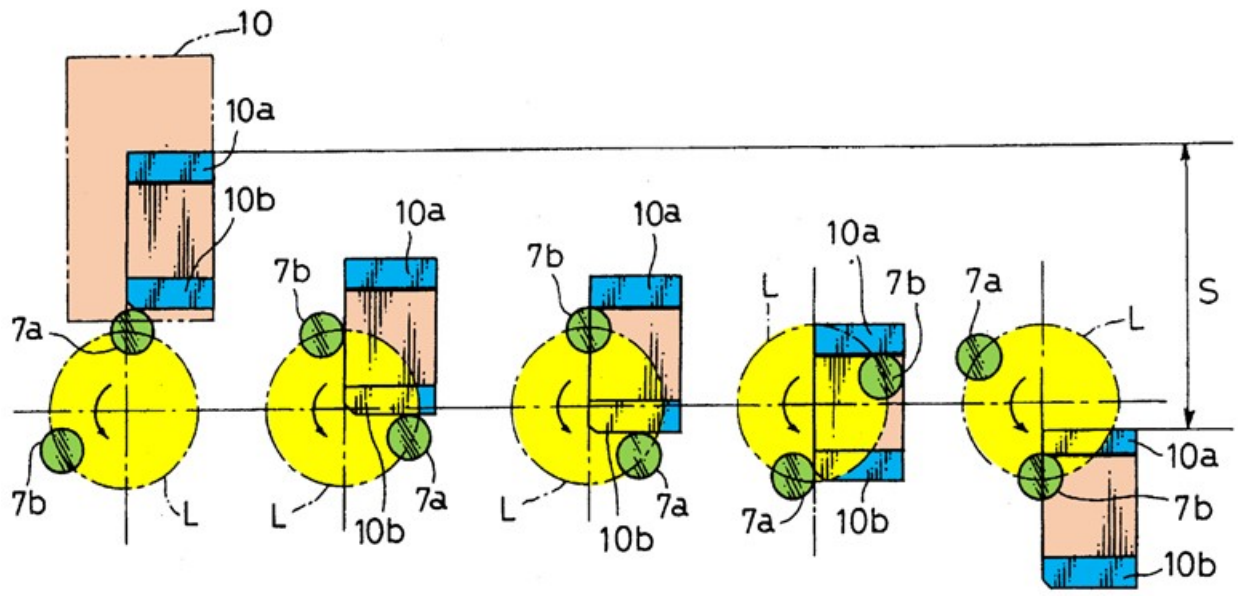


FIG. 4(E) FIG. 4(D) FIG. 4(C) FIG. 4(B) FIG. 4(A)

15. Claims 19-20

Claim 19 is identical to Claim 2 and is met as described above. Claim 20 is substantially identical to Claim 3 and is met as described above.

D. Ground 4: Claims 1-20 are Obvious based on Pedicini

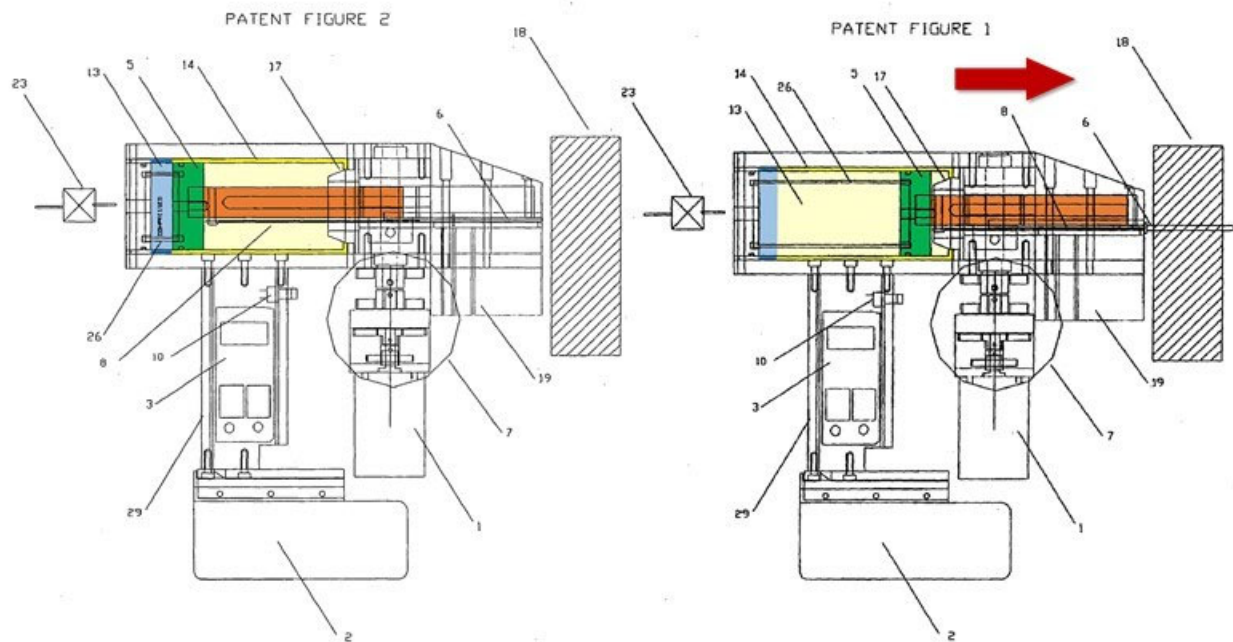
1. Claim 1

Element [1.P]

U.S. Patent Publication No. 2006/0180631 (“Pedicini”) discloses “[a] fastener driver adapted for use in a fastener driving tool.” Pedicini discloses a fastener driving tool (“fastener device 100”). Pedicini, Figs. 1-4; ¶ [0077].

Element [1.1]

Pedicini discloses “a hollow cylinder having a movable piston therewithin, said hollow cylinder containing a displacement volume created by a stroke of said piston.” Pedicini’s hollow cylinder (“cylinder (14),” yellow) includes a piston (“piston (5),” green) that can “move within the cylinder (14).” Pedicini, ¶¶[0077]-[0078], Figs. 1-4. The hollow cylinder has a displacement volume created by the stroke of the piston (yellow below), which is reflected by the piston illustrated at its raised position in Fig. 2 and at its lower position in Fig. 1. Pedicini, Figs. 1-3.



Element [1.2]

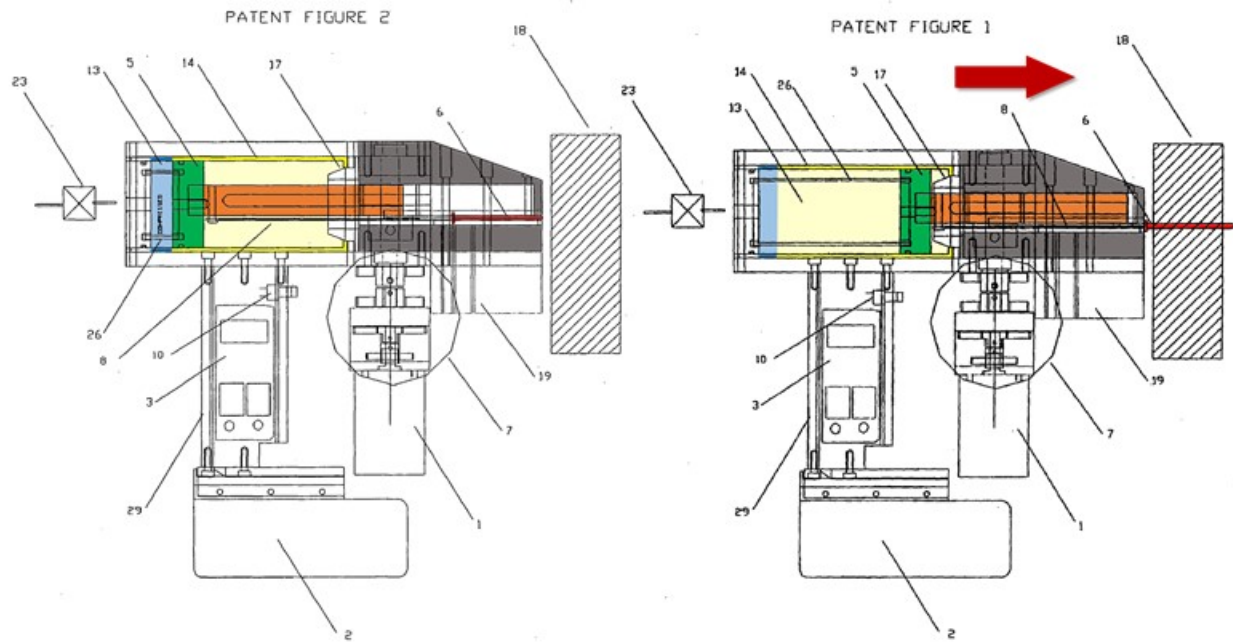
Pedicini discloses “a guide body that is sized and shaped to receive a fastener that is to be driven.” Pedicini discloses a guide body (grey) that is sized and shaped

Element [1.3]

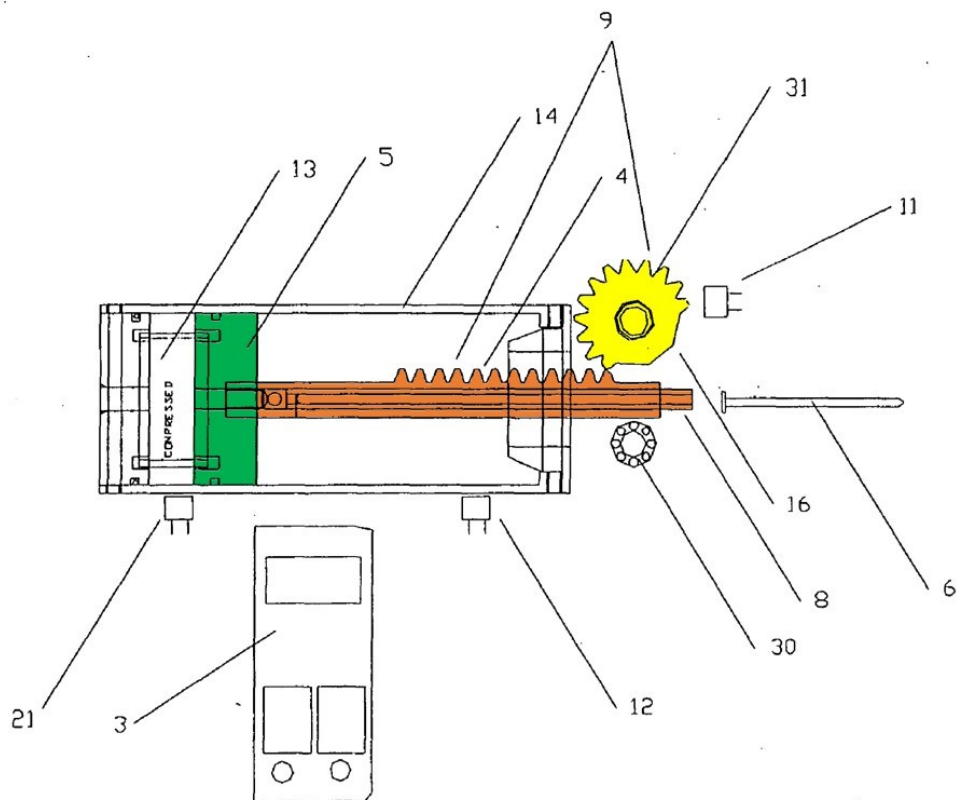
Pedicini discloses “a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body.” Pedicini’s movable driver (“rack (4)” and “anvil (8),” orange) is in communication with the piston (“piston (5),” green) and that is sized and shaped to push the fastener (“fastener (6),” red) from the guide body (grey). Pedicini, Figs. 1-2, ¶¶[0077]-[0078].

Element [1.3]

Pedicini discloses “a movable driver that is in communication with said piston, said movable driver being sized and shaped to push said fastener from said guide body.” Pedicini’s movable driver (“rack (4)” and “anvil (8),” orange) is in communication with the piston (“piston (5),” green) and that is sized and shaped to push the fastener (“fastener (6),” red) from the guide body (grey). Pedicini, Figs. 1-2, ¶¶[0077]-[0078].

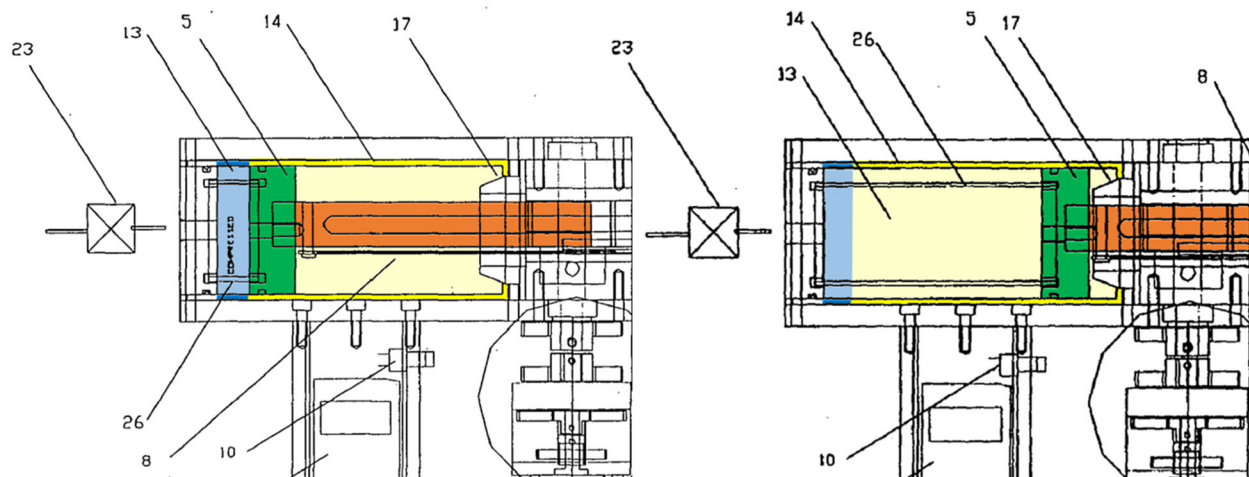


PATENT FIGURE 3



Element [1.4]

Pedicini discloses “a storage chamber that is in fluidic communication at all times with said displacement volume of the cylinder.” Pedicini has a storage chamber, which is the overhead portion of the “chamber (13)” within “cylinder 14,” *i.e.*, the volume above the piston (blue). Pedicini, Figs. 1-2.



Pedicini’s storage chamber (blue) is distinct from the displacement volume (yellow) of cylinder 14 and remains in fluidic communication at all times with the cylinder and its displacement volume, which is shown in Figures 1-2 where the storage chamber is directly adjacent to the displacement volume. As explained above, the ITC’s decision regarding “main storage chamber” was based on Patent Owner’s post-agreement argument that the agreed construction required the “main storage chamber” to be distinct from *any* region within the “hollow cylinder,” and not—as Petitioner understood the agreement—distinct from the “displacement volume” recited in the claims, which is the region “created by a stroke of said

piston.” ’954 patent, 10:12-15. The region annotated above in blue is above the travel path of the piston and thus is not part of the “displacement volume.” Vallee, ¶199. Accordingly, that blue region is distinct from the claimed “displacement volume” and constitutes a separate volume that should satisfy the “storage chamber” limitation.

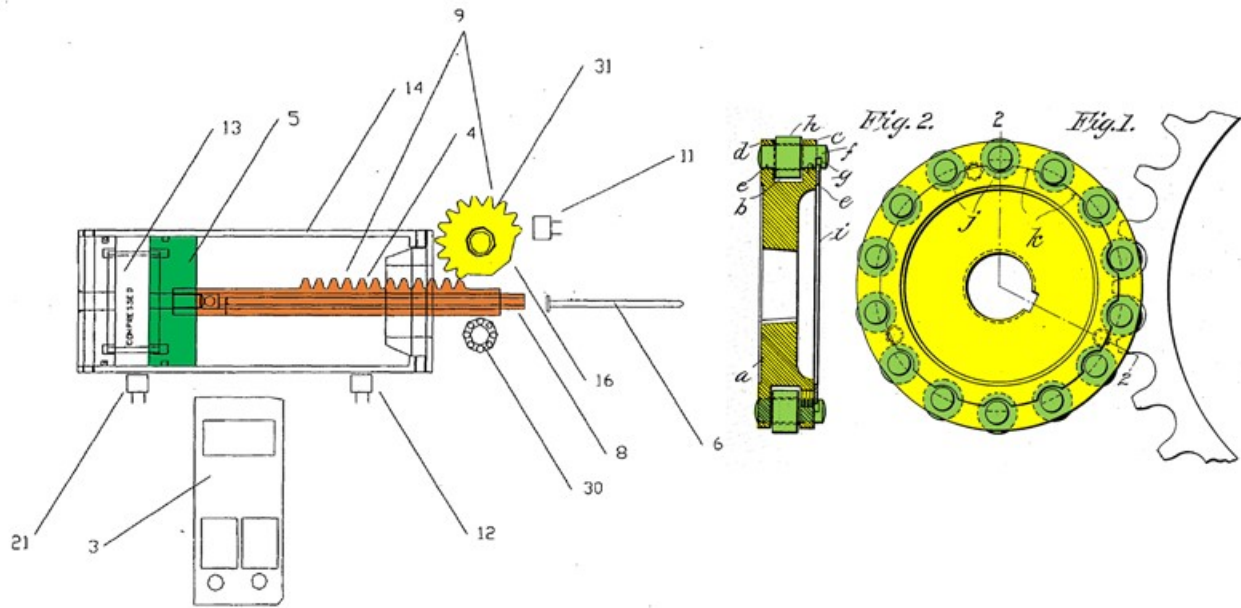
Pedicini’s storage chamber and displacement volume are “initially charged with a pressurized gas and remain above atmospheric pressure during all portions of an operating cycle, in which said pressurized gas is re-used for more than one driving cycle.” Pedicini states that “[a] release valve (23) is used to replenish the air which may be lost between nail drives.” Pedicini, ¶[0077], Figs. 1-2. Pedicini also states that “it is possible to precharge the air chamber (13) to eliminate the piston return spring (26)”--while Pedicini goes on to say that “this is not preferable since it complicates recovering from fastener jams,” Pedicini includes an embodiment (Figure 4) where the piston return spring 26 is indeed eliminated. Pedicini, ¶[0077], Fig. 4. A POSITA would understand the disclosure of a sealed main storage chamber and a release valve for “replenishing the air” means that the chamber is “initially charged with a pressurized gas” that “is re-used for more than one driving cycle,” and that it will “remain above atmospheric pressure during all portions of an operating cycle,” since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶¶200-201. Nor would a POSITA

misinterpret the valve in Pedicini as a connection point for a pneumatic hose to attached and supply gas throughout operation (as opposed to only an initial charge), since Pedicini explicitly denigrates the “[n]on-portability” of “[t]raditional nail guns [that] are tethered to a fixed compressor.” Pedicini, ¶[0017].

Element [1.5]

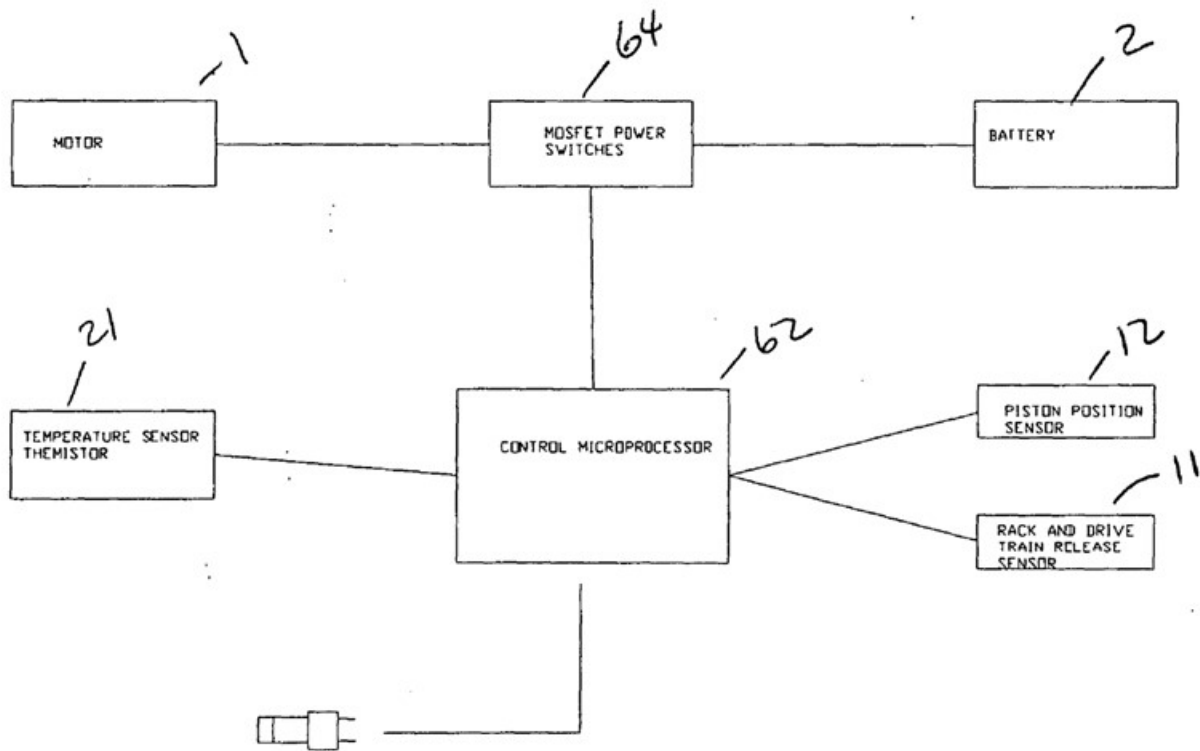
Pedicini discloses a rack-and-pinion gear with gear teeth on its outer perimeter (“rack pinion (31)”), and thus does not disclose the claimed “lifter.” Pedicini, ¶[0078], Figs. 3 (below left), 4; Vallee, ¶202. An obvious variant of Pedicini’s rack-and-pinion gear was to implement the well-known “roller” modification—where the gear teeth are replaced with rollers along the outer perimeter that can better handle friction and are thus less at risk to wearing down over time—to obtain a “roller pinion,” which is disclosed and touted by U.S. Patent No. 860,536 (“Ellingham”). Vallee, ¶203; Ellingham, 1:8-14, Figs. 1-2 (below right). The Patent Owner has accused such a “roller pinion” lifting mechanism in Petitioner’s products as being a “lifter member.” If such a lifting mechanism could constitute a “lifter,” then it would be rendered obvious by Pedicini in view of the well-known “roller pinion” such as that disclosed by (and whose use is encouraged by) Ellingham, for example. In that case, Pedicini renders obvious Element 1.5: “a lifter that, under first predetermined conditions, moves said movable driver toward a ready position.”

PATENT FIGURE 3



Pedicini discloses a “control circuit (3)” that “includes a microprocessor (62), high power switching elements (64) to drive the motor (1) and at least two control circuit inputs which include a piston position sensor (12) and a rack and drive train release sensor (11).” Pedicini, Fig. 6, ¶[0083]. Specifically, “sensor (12) may be used to determine the position of the anvil (8), piston (5) and rack (4) in the forward position to notify the control circuit (3) that the fastener device (100) is ready for another cycle.” Pedicini, ¶[0078]. Thus, under first predetermined conditions—that is, with the piston in the forward position after a drive cycle as detected by piston position sensor (12)—Pedicini’s control circuit (3) will direct the high power switching elements (64) to connect battery (2) to the motor (1) to power the lifter to move the movable driver toward the ready position. Vallee, ¶204.

PATENT FIGURE 6

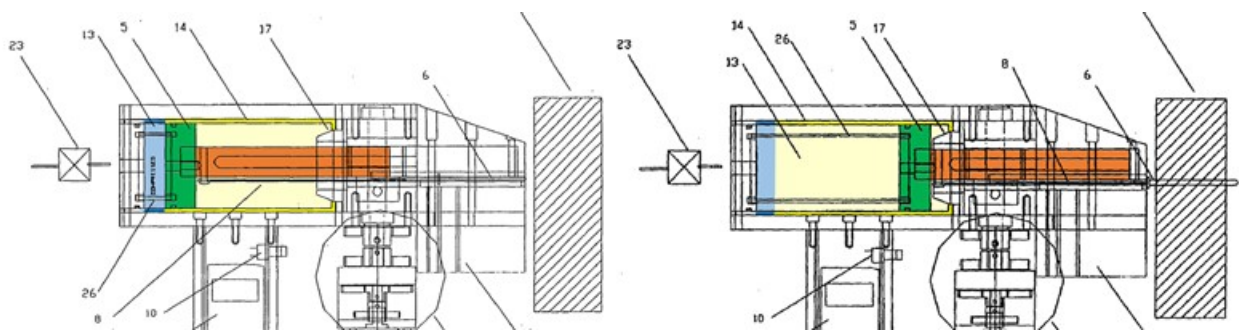


Element [1.6]

Pedicini discloses “wherein: said cylinder and piston act as a gas spring, under second predetermined conditions, to move said movable driver toward a driven position, using said pressurized gas of both said storage chamber and said displacement volume acting on said piston.” Pedicini discloses “a sear pin or lever (28) which maintains the rack (4), piston (5) and anvil (80) in the energized state” such that “[u]pon actuation of the trigger (32) of the sear lever, the mechanism is released and energetically pushes the fastener into the substrate.” Pedicini, ¶[0080],

Fig. 4. Thus, under second predetermined conditions (i.e., with the piston at its upper position and sear pin or lever (28) actuated), the driver will be moved toward a driven position using the pressurized gas of the storage chamber and displacement volume. Vallee, ¶205.

In Pedicini, the pressurized gas of the storage chamber (blue below, the portion of “chamber (13)” above the piston) and the displacement volume in the cylinder (yellow below, the portion of “chamber (13)” within “cylinder (14)” through which the piston moves) act as a gas spring to move the movable driver (“piston (5)”) toward a driven position. When the piston is raised, the gas in the main storage chamber and the displacement volume is compressed, and when decoupled from the “rack pinion (31),” the “piston (5),” along with its attached “rack (4)” and “anvil (8),” then “rapidly accelerate under the force of the compressed air.” Vallee, ¶206; Pedicini, ¶[0078], Figs. 1-2.

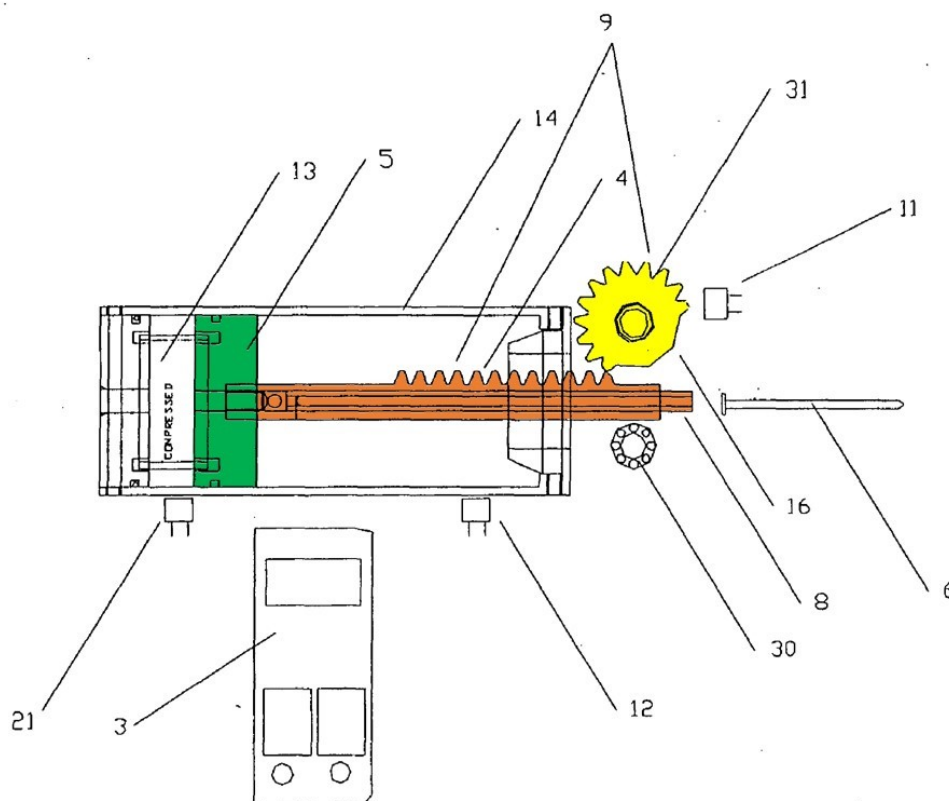


2. Claim 2

Pedicini discloses “wherein said movable driver comprises an elongated shape with at least one longitudinal edge, and having a plurality of protrusions that are

located along said at least one longitudinal edge, said plurality of protrusions being spaced-apart from one another.” Pedicini’s movable driver has an elongated shape and numerous protrusions located along its longitudinal edge, which are the gear teeth shown below in Fig. 3. Pedicini, Fig. 3, ¶[0078]; Vallee, ¶[207].

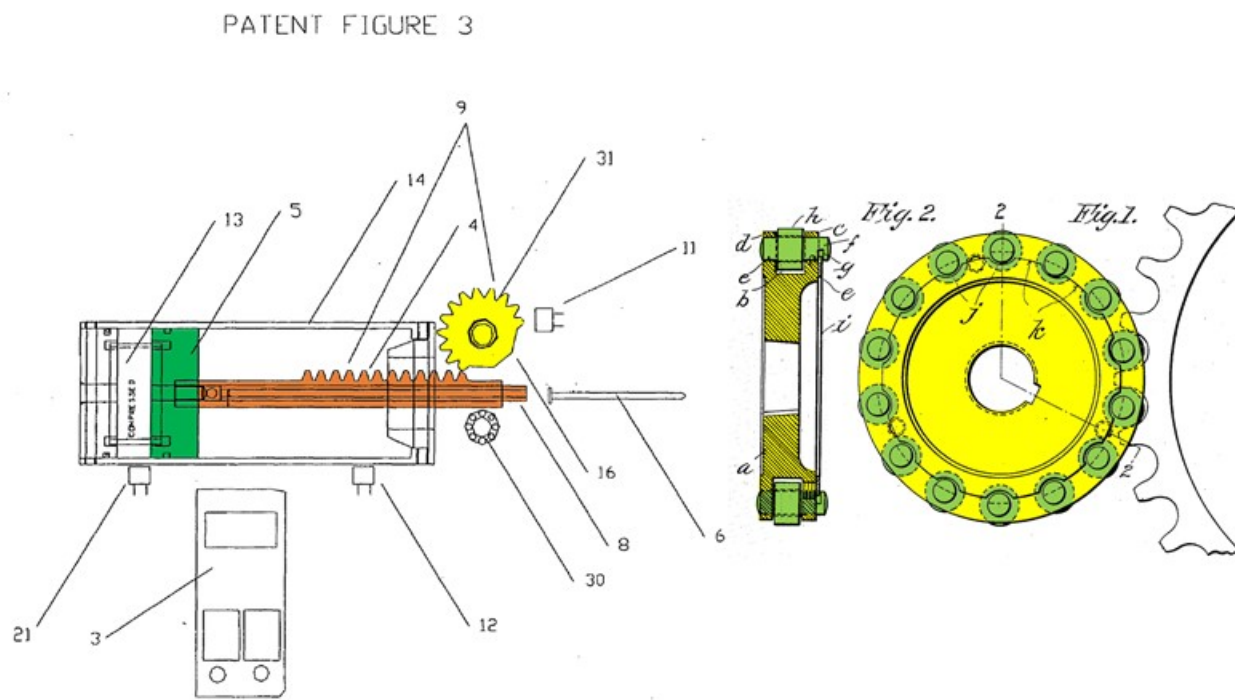
PATENT FIGURE 3



3. *Claim 3*

Pedicini’s lifting mechanism modified with the roller pinion of Ellingham discloses “wherein said lifter comprises at least one disk that includes at least one extension that protrudes from its surface which, under first predetermined conditions, contacts said movable driver and forces said movable driver to move

toward its ready position, using a rotary-to-linear motion.” Pedicini’s modified lifter includes a disk (yellow, below right) with multiple extensions protruding from its surface (roller pinions, light green), which moves the movable driver (orange, below left) toward its ready position under first predetermined conditions (*see* Element [1.5]). Pedicini, Fig. 3; Ellingham, Figs. 1-2; Vallee, ¶¶208-209.



Pedicini’s lifting mechanism is a rotatable pinion (“rack pinion (31),” above left) that moves in rotational motion (clockwise in Fig. 3) to cause the driver (orange) to move in a linear motion (leftward in Fig. 3). Pedicini, Fig. 3, ¶[0078]. This is not altered by the roller pinion modification. *See* Ellingham, Fig. 1.

4. Claim 4

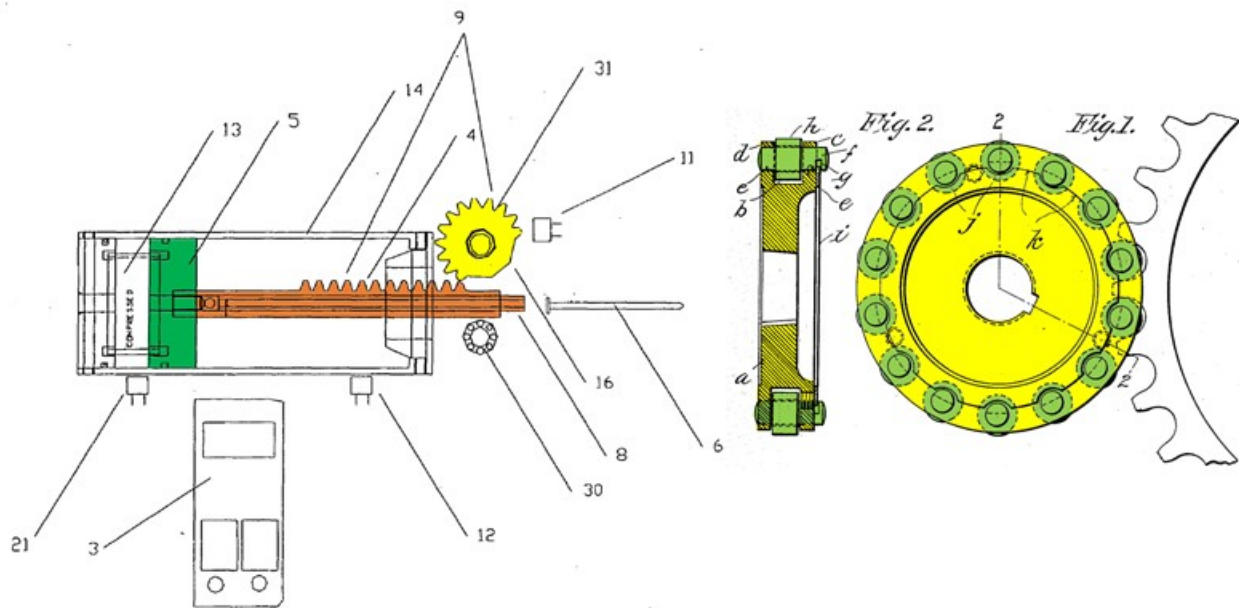
Element [4.1]

Element 4.1 is identical to Element 2 and is met as described above.

Element [4.2]

Pedicini discloses “such that said at least one extension of said lifter fits in a space between said spaced-apart plurality of protrusions, and a rotating motion of said lifter causes said at least one extension of the lifter to engage said plurality of protrusions of the movable driver, thereby causing said movable driver to move in a substantially linear direction within a driver track of said guide body.” Pedicini’s modified lifter includes extensions protruding from its surface (roller pinions, light green) that fit between the spaced-apart protrusions of the driver (gear teeth on driver, orange). Pedicini, Fig. 3; Ellingham, Figs. 1-2; Vallee, ¶211.

PATENT FIGURE 3

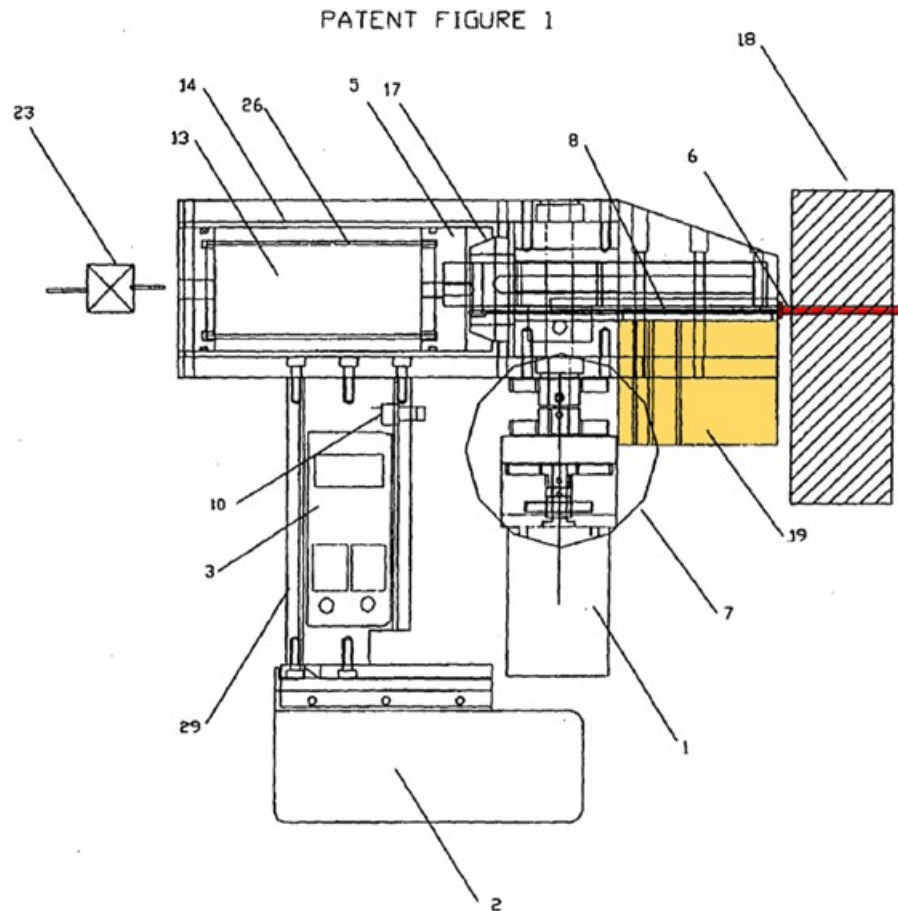


Thus, the lifter is rotated (clockwise in Fig. 3) such that its extensions (light green) engage the protrusions on the driver to cause the driver (orange) to move in a linear direction (leftward in Fig. 3) within the driver track of the guide body. Pedicini, Fig. 3; Ellingham, Figs. 1-2; Vallee, ¶212.

5. Claim 5

Pedicini discloses “further comprising: a magazine that contains a plurality of fasteners, said magazine providing a fastener at a receiving position of said driver track of the guide body so that, during a driving stroke, said movable driver moves toward said driven position, while pushing said fastener toward an exit portion of said driver track.” Pedicini’s magazine (“fastener feeder (19),” light orange) contains a plurality of fasteners (“fasteners (6),” red), and provides them at a

receiving position of the driver track of the guide body so that they are pushed by the movable driver toward an exit portion and into the workpiece. Pedicini, ¶[0077], Fig. 1; Vallee, ¶213.



6. Claim 6

Pedicini discloses “wherein: said hollow cylinder is the sole pressurized cylinder of the fastener driver.” Pedicini’s hollow cylinder is the sole pressurized cylinder. Pedicini, Figs. 1-4.

7. *Claim 7*

In the event that claim 7's contradiction with claim 1 is held to be a correctable error rather than rendering claim 7 indefinite, *see* §I.A.7, then this element is disclosed by Pedicini as explained above in relation to Elements 1.5-1.6.

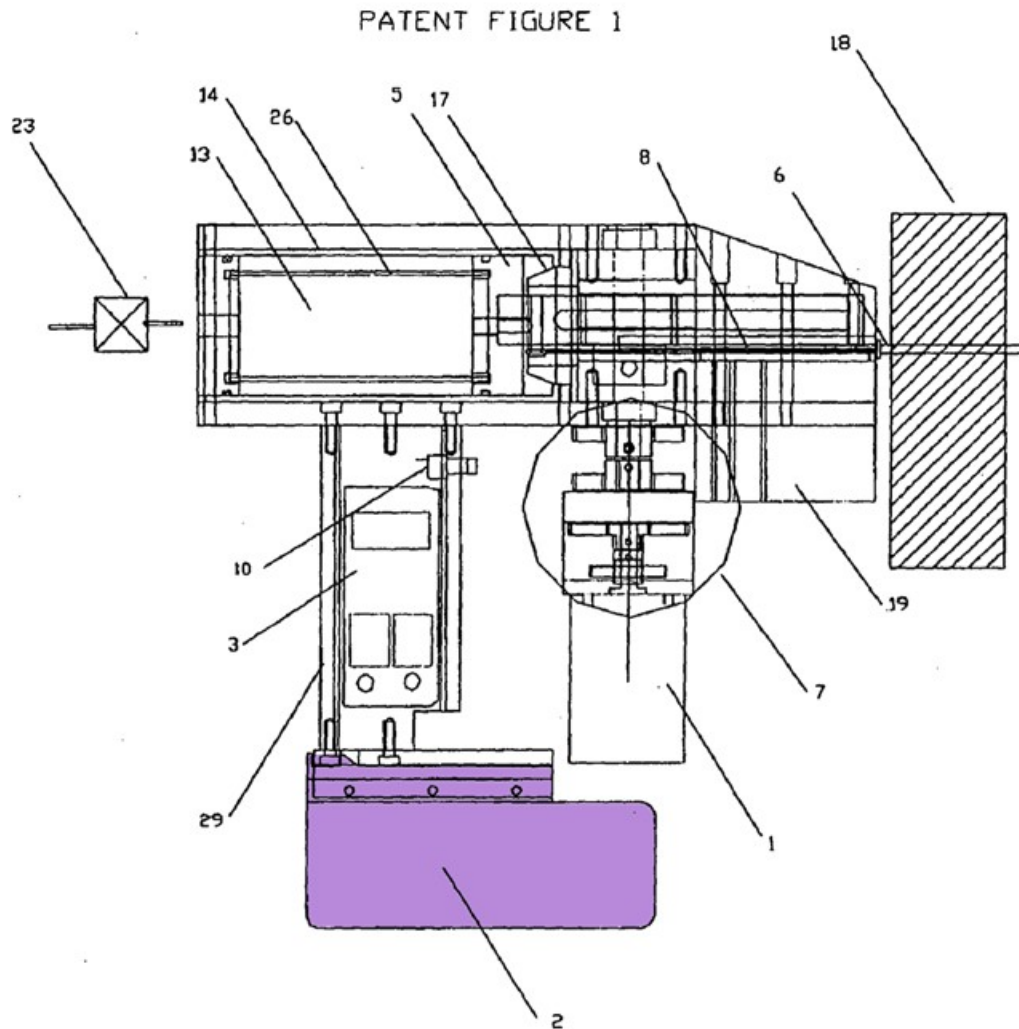
8. *Claim 8*

Elements [8.P]-[8.4], [8.6] and [8.9]

Elements 8.P-8.2, 8.4, 8.6 and 8.9 are identical to Elements 1.P-1.2 and 1.4-1.6, respectively, and are met as described above. Element 8.3 is substantially identical to Element 1.3 and met as described above,

Element [8.5]

Pedicini discloses “an on-board electrical energy source, with no external energy source attached to said fastener driving tool.” Pedicini discloses an on-board electrical power source (“power source (2), purple), which “may be a rechargeable battery to provide power to the motor (1),” and thus has no external energy source attached. Pedicini, ¶[0077], Fig. 1.



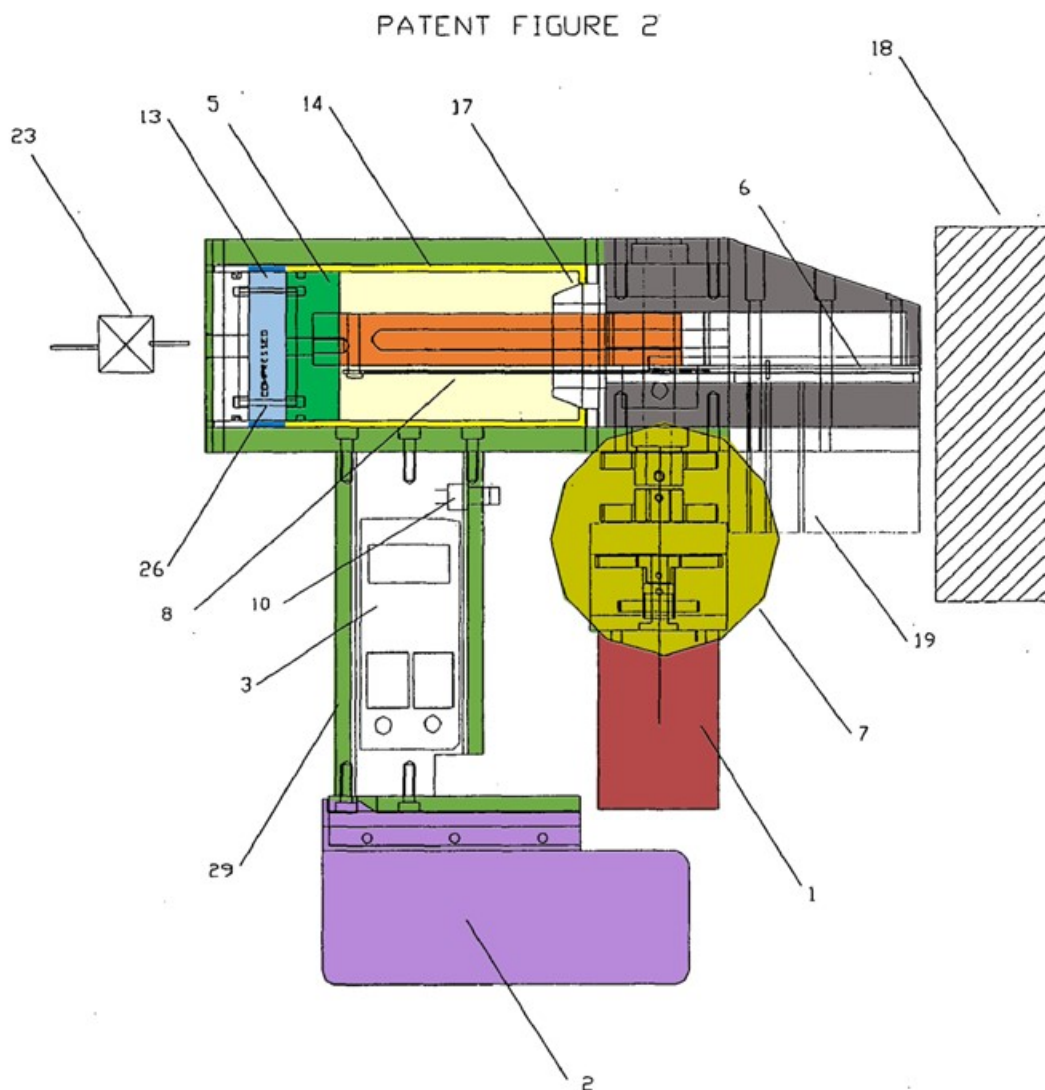
Element [8.7]

Pedicini discloses “a prime mover that is powered by said on-board electrical energy source, said prime mover causing said lifter to move, under first predetermined conditions.” Pedicini’s prime mover (“motor (1)”) is referred to as “electric motor,” is powered by the on-board electrical energy source (“power source (2)”), and causes the lifting gear (“rack pinion (31)”) to mechanically engage the driver (“rack (4)”) under the first predetermined conditions. Pedicini, ¶¶[0033]-

[0034], [0077]-[0078], Figs. 3-4; Vallee, ¶220; *see* Element 1.5. This is not altered by the roller pinion modification. Ellingham, Fig. 1; Vallee, ¶220.

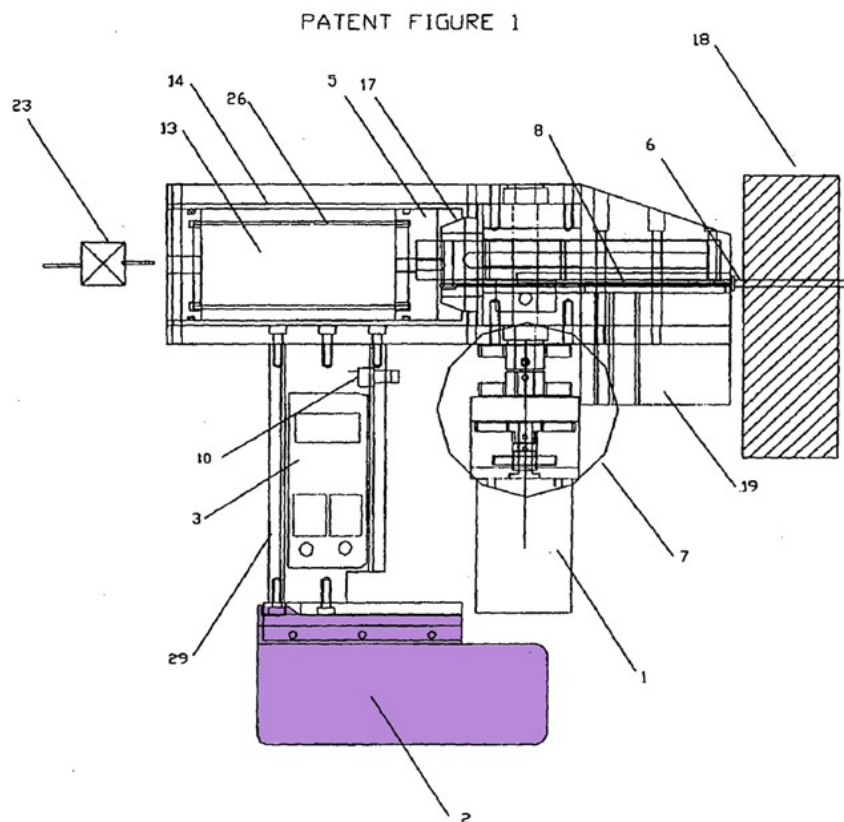
Element [8.8]

Pedicini discloses “a housing that holds said hollow cylinder, guide body, movable driver, storage chamber, on-board electrical energy source, lifter, and prime mover as a single, portable hand-operable tool.” Pedicini’s housing is shown below in dark green and holds, as a single, portable hand-operable tool, its hollow cylinder (yellow), guide body (grey), movable driver (orange), storage chamber (blue), on-board electrical energy source (purple), lifter (dark yellow), and prime mover (dark red). Pedicini, Fig. 2; Vallee, ¶221.



9. *Claim 9*

Pedicini discloses “wherein said on-board electrical energy source comprises a battery.” Pedicini states that its on-board electrical power source (“power source (2), purple) “may be a rechargeable battery to provide power to the motor (1).” Pedicini, ¶[0077], Fig. 1.



10. Claim 10

Pedicini discloses “wherein said prime mover comprises an electric motor.” Pedicini’s prime mover (“motor (1)”) is referred to as “electric motor” and is powered by an electrical power source. Pedicini, ¶¶[0033]-[0034]; Vallee, ¶223.

11. Claim 11

Claim 11 is identical to Claim 7 and is met as described above.

12. Claim 12

Pedicini discloses “wherein said prime mover is powered by an electrical power supply that is carried on said tool.” Pedicini’s prime mover (“motor (1)”) is referred to as “electric motor” and is powered by the on-board electrical power

supply (“power source (2)”). Pedicini, ¶¶[0033]-[0034], [0077]-[0078], Figs. 3-4; Vallee, ¶225.

13. Claims 13-17

Claims 13-17 are identical to Claims 2-6, respectively, and are met as described above.

14. Claim 18

Elements [18.P]-[18.4] and [18.6]

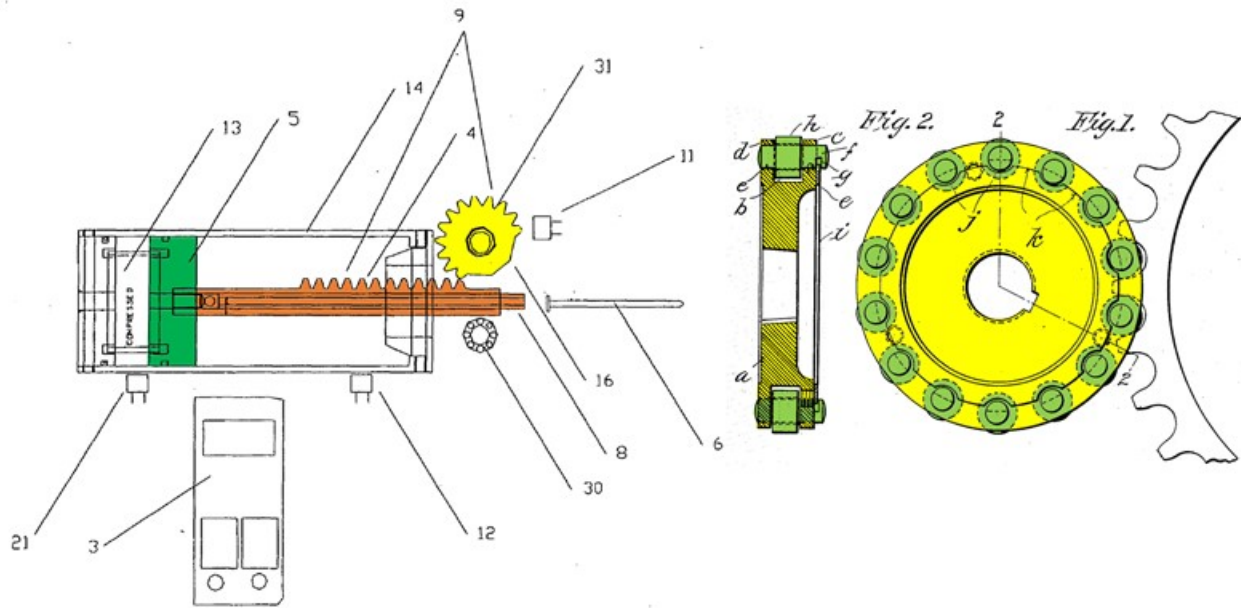
Elements 18.P-18.4 and 18.6 are identical to Elements 1.P-1.4 and 1.6, respectively, and are met as described above.

Element [18.5]

Element 18.5 is met as described above for Element 1.5.

As discussed above in relation to claim 3, *see* §I.D.3, Pedicini’s modified lifter includes a rotating disk (yellow) that moves in rotational motion (clockwise in Fig. 3) to cause the driver (orange) to move in a linear motion (leftward in Fig. 3), thus using rotary-to-linear motion. Pedicini, Fig. 3; Ellingham, Figs. 1-2; Vallee, ¶¶228-229. This is not altered by the roller pinion modification. *See* Ellingham, Fig. 1.

PATENT FIGURE 3



15. Claims 19-20

Claim 19 is identical to Claim 2 and is met as described above. Claim 20 is substantially identical to Claim 3 and is met as described above.

VIII. CONCLUSION

Accordingly, Petitioner requests *inter partes* review of claims 1-20 pursuant to Grounds 1-4 set forth above.

Date: December 13, 2024

Respectfully submitted,

/Amol A. Parikh/

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CERTIFICATION UNDER 37 C.F.R. § 42.24

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,681 words, which is less than the 14,000 allowed under 37 C.F.R. § 42.24.

Date: December 13, 2024

/Amol A. Parikh/

Amol A. Parikh

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CERTIFICATE OF SERVICE

I hereby certify that on this 13th day of December, 2024, a copy of this Petition, including all exhibits, has been served in its entirety by FedEx Express to the Patent Owner by serving the correspondence address of record as follows:

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